Vol. 1118 Number 3

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

1790 ***Celebrating 200 Years of Creativity*** 1990

PATENTS

September 18, 1990

U.S. DEPARTMENT OF COMMERCE

Patent and Trademark Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

September 18, 1990 Volume 1118 Number 3

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $10.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1118 O.G. 14 on Sept. 11, 1990.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of March 1, 1990, and was announced in the *Official Gazette* at 1111 O.G. 24 on Feb. 20, 1990.

International PCT fees were changed on September 1, 1990 due to a difference in the exchange rate of the U.S. dollar in relaton to the Swiss Franc and were announced in the *Official Gazette* at 1116 O.G. 32 on July 17, 1990.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1242.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA.	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	502.00
Basic Supplemental fee (for each page over 30)	10.00
Designation fee per country or region for the first 10 national or regional offices	122.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	154.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	30.00	30.00

Aug. 16, 1990

HARRY F. MANBECK, Jr.
Assistant Secretary and Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on September 15, 1987 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,692,946 through 4,694,504
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on September 13, 1983 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,403,353 through 4,404,686
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)).....$245.00
By other than a small entity.....$490.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)).....$495.00
By other than a small enttity.....$990.00"

The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27,1982.....$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)).....$60.00
By other than a small entity.....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED JULY 8 , 1990
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,337,551	06/289,708	7/06/82
4,337,559	06/281,741	7/06/82
4,337,561	06/289,152	7/06/82
4,337,678	06/249,048	7/06/82
4,337,694	06/278,629	7/06/82
4,337,725	06/243,340	7/06/82
4,337,782	06/266,215	7/06/82
4,337,783	06/231,145	7/06/82
4,337,799	06/252,917	7/06/82
4,337,811	06/277,172	7/06/82
4,337,816	06/256,988	7/06/82
4,337,825	06/231,983	7/06/82
4,337,860	06/304,315	7/06/82
4,337,875	06/243,068	7/06/82
4,337,888	06/254,002	7/06/82
4,337,919	06/275,496	7/06/82
4,338,073	06/253,153	7/06/82
4,338,093	06/279,375	7/06/82
4,338,097	06/217,151	7/06/82
4,338,104	06/273,836	7/06/82
4,338,118	06/276,588	7/06/82
4,338,137	06/285,248	7/06/82
4,338,162	06/216,694	7/06/82
4,338,203	06/231,647	7/06/82
4,338,206	06/246,512	7/06/82
4,338,235	06/220,952	7/06/82
4,338,236	06/220,956	7/06/82
4,338,257	06/238,338	7/06/82
4,338,281	06/254,855	7/06/82
4,338,296	06/231,528	7/06/82
4,338,321	06/233,429	7/06/82
4,338,363	06/234,476	7/06/82
4,338,373	06/217,919	7/06/82
4,338,374	06/217,918	7/06/82
4,338,392	06/287,662	7/06/82
4,338,394	06/220,756	7/06/82
4,338,400	06/228,240	7/06/82
4,338,404	06/228,505	7/06/82
4,338,441	06/225,198	7/06/82
4,338,444	06/217,864	7/06/82
4,338,446	06/238,483	7/06/82
4,338,449	06/273,718	7/06/82
4,338,458	06/245,519	7/06/82
4,338,459	06/240,721	7/06/82
4,338,478	06/218,018	7/06/82
4,338,482	06/234,646	7/06/82
4,338,551	06/215,768	7/06/82
4,338,570	06/271,061	7/06/82
4,338,646	06/257,837	7/06/82
4,598,430	06/651,250	7/08/86
4,598,439	06/678,080	7/08/86
4,598,445	06/688,311	7/08/86
4,598,446	06/654,416	7/08/86
4,598,448	06/583,246	7/08/86
4,598,450	06/685,911	7/08/86
4,598,457	06/769,219	7/08/86
4,598,464	06/573,393	7/08/86
4,598,465	06/539,146	7/08/86
4,598,474	06/619,393	7/08/86
4,598,480	06/794,690	7/08/86
4,598,481	06/764,678	7/08/86
4,598,485	06/743,383	7/08/86
4,598,492	06/781,270	7/08/86
4,598,498	06/730,088	7/08/86
4,598,500	06/761,741	7/08/86
4,598,505	06/699,746	7/08/86
4,598,509	06/747,926	7/08/86
4,598,519	06/630,822	7/08/86
4,598,524	06/755,895	7/08/86
4,598,527	06/662,366	7/08/86
4,598,530	06/747,790	7/08/86
4,598,549	06/740,220	7/08/86
4,598,550	06/679,643	7/08/86
4,598,554	06/702,578	7/08/86
4,598,555	06/787,634	7/08/86
4,598,561	06/740,647	7/08/86
4,598,576	06/624,002	7/08/86
4,598,578	06/633,988	7/08/86
4,598,579	06/663,871	7/08/86
4,598,582	06/629,850	7/08/86
4,598,583	06/558,498	7/08/86
4,598,592	06/546,970	7/08/86
4,598,594	06/732,536	7/08/86
4,598,597	06/707,972	7/08/86
4,598,598	06/576,156	7/08/86
4,598,607	06/693,650	7/08/86

Patent Number	Serial Number	Issue Date
4,598,626	06/685,204	7/08/86
4,598,631	06/652,224	7/08/86
4,598,635	06/740,703	7/08/86
4,598,637	06/645,417	7/08/86
4,598,641	06/697,735	7/08/86
4,598,644	06/720,490	7/08/86
4,598,650	06/789,430	7/08/86
4,598,651	06/653,680	7/08/86
4,598,653	06/755,981	7/08/86
4,598,657	06/782,146	7/08/86
4,598,659	06/627,994	7/08/86
4,598,662	06/465,768	7/08/86
4,598,672	06/699,217	7/08/86
4,598,688	06/429,301	7/08/86
4,598,690	06/721,459	7/08/86
4,598,696	06/726,579	7/08/86
4,598,698	06/692,434	7/08/86
4,598,699	06/743,000	7/08/86
4,598,706	06/584,122	7/08/86
4,598,721	06/665,838	7/08/86
4,598,723	06/657,767	7/08/86
4,598,724	06/643,171	7/08/86
4,598,725	06/691,859	7/08/86
4,598,734	06/775,698	7/08/86
4,598,737	06/763,341	7/08/86
4,598,740	06/488,238	7/08/86
4,598,742	06/794,598	7/08/86
4,598,746	06/717,830	7/08/86
4,598,749	06/691,318	7/08/86
4,598,762	06/575,983	7/08/86
4,598,766	06/421,485	7/08/86
4,598,783	06/653,456	7/08/86
4,598,802	06/655,538	7/08/86
4,598,807	06/674,392	7/08/86
4,598,817	06/755,790	7/08/86
4,598,822	06/703,220	7/08/86
4,598,824	06/646,636	7/08/86
4,598,825	06/686,945	7/08/86
4,598,836	06/660,200	7/08/86
4,598,839	06/495,526	7/08/86
4,598,841	06/512,969	7/08/86
4,598,847	06/580,732	7/08/86
4,598,848	06/807,129	7/08/86
4,598,855	06/406,770	7/08/86
4,598,858	06/717,241	7/08/86
4,598,874	06/558,358	7/08/86
4,598,887	06/773,091	7/08/86
4,598,895	06/646,099	7/08/86
4,598,902	06/686,209	7/08/86
4,598,906	06/669,640	7/08/86
4,598,912	06/654,970	7/08/86
4,598,914	06/625,046	7/08/86
4,598,916	06/678,721	7/08/86
4,598,919	06/617,479	7/08/86
4,598,925	06/529,736	7/08/86
4,598,927	06/719,525	7/08/86
4,598,928	06/572,101	7/08/86
4,598,931	06/693,679	7/08/86
4,598,940	06/681,286	7/08/86
4,598,945	06/769,349	7/08/86
4,598,949	06/671,510	7/08/86
4,598,959	06/548,979	7/08/86
4,598,963	06/548,739	7/08/86
4,598,968	06/292,591	7/08/86
4,598,971	06/718,561	7/08/86
4,598,976	06/728,033	7/08/86
4,598,978	06/468,712	7/08/86
4,598,987	06/674,805	7/08/86
4,598,988	06/653,602	7/08/86
4,598,995	06/729,546	7/08/86
4,599,003	06/693,563	7/08/86
4,599,012	06/672,807	7/08/86
4,599,017	06/588,133	7/08/86
4,599,023	06/681,379	7/08/86
4,599,029	06/709,833	7/08/86
4,599,033	06/577,261	7/08/86
4,599,035	06/694,972	7/08/86
4,599,039	06/539,730	7/08/86
4,599,046	06/482,957	7/08/86
4,599,048	06/722,192	7/08/86
4,599,052	06/714,694	7/08/86
4,599,057	06/673,744	7/08/86
4,599,059	06/642,243	7/08/86
4,599,066	06/792,165	7/08/86
4,599,070	06/288,131	7/08/86
4,599,072	06/589,357	7/08/86
4,599,074	06/671,205	7/08/86
4,599,081	06/430,403	7/08/86
4,599,084	06/497,624	7/08/86
4,599,085	06/575,696	7/08/86
4,599,092	06/559,725	7/08/86
4,599,106	06/736,748	7/08/86
4,599,126	06/491,319	7/08/86
4,599,140	06/602,882	7/08/86
4,599,146	06/674,739	7/08/86
4,599,147	06/629,855	7/08/86
4,598,158	06/717,833	7/08/86
4,599,172	06/686,072	7/08/86
4,599,177	06/597,237	7/08/86
4,599,179	06/512,919	7/08/86
4,599,194	06/621,404	7/08/86
4,599,205	06/624,004	7/08/86
4,599,225	06/752,097	7/08/86
4,599,236	06/720,910	7/08/86
4,599,237	06/768,726	7/08/86
4,599,258	06/715,286	7/08/86
4,598,278	06/696,455	7/08/86
4,599,283	06/522,823	7/08/86
4,599,308	06/536,579	7/08/86
4,599,331	06/685,568	7/08/86
4,599,333	06/591,904	7/08/86
4,599,337	06/755,404	7/08/86
4,599,346	06/630,963	7/08/86
4,599,347	06/560,699	7/08/86
4,599,348	06/648,910	7/08/86
4,599,349	06/597,777	7/08/86
4,599,350	06/675,159	7/08/86
4,599,351	06/575,971	7/08/86
4,599,355	06/637,882	7/08/86
4,599,359	06/668,896	7/08/86
4,599,390	06/777,458	7/08/86
4,599,398	06/652,699	7/08/86
4,599,409	06/580,181	7/08/86
4,599,415	06/720,744	7/08/86
4,599,417	06/668,156	7/08/86
4,599,423	06/595,751	7/08/86
4,599,430	06/576,294	7/08/86
4,599,436	06/479,746	7/08/86
4,599,446	06/723,800	7/08/86
4,599,448	06/579,834	7/08/86
4,598,450	06/608,990	7/08/86
4,599,452	06/616,894	7/08/86
4,599,461	06/690,120	7/08/86
4,599,467	06/722,180	7/08/86
4,599,468	06/744,569	7/08/86
4,599,516	06/472,199	7/08/86
4,599,536	06/581,826	7/08/86
4,599,544	06/613,459	7/08/86
4,599,554	06/679,939	7/08/86
4,599,566	06/480,639	7/08/86
4,599,577	06/705,705	7/08/86
4,599,588	06/570,602	7/08/86
4,599,592	06/697,627	7/08/86
4,599,605	06/690,085	7/08/86
4,599,609	06/678,538	7/08/86
4,599,614	06/531,940	7/08/86
4,599,616	06/512,435	7/08/86
4,599,622	06/629,926	7/08/86
4,599,630	06/669,838	7/08/86
4,599,633	06/675,924	7/08/86
4,599,646	06/611,756	7/08/86
4,599,665	06/732,881	7/08/86
4,599,682	06/667,808	7/08/86
4,599,683	06/623,822	7/08/86
4,599,686	06/645,812	7/08/86
4,599,687	06/672,259	7/08/86

Patent Nimber	Serial Number	Issue Date	4,599,731	06/604,686	7/08/86
			4,599,736	06/632,582	7/08/86
4,599,700	06/731,597	7/08/86	4,599,745	06/612,484	7/08/86
4,599,726	06/606,039	7/08/86			

NOTIFICATION OF ACCEPTANCE OF DELAYED PAYMENT OF MAINTENANCE FEE (35 U.S.C. 41(c); 37 CFR 1.378)

The patent(s) listed below is considered as not having expired but is subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fee which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,498,747	06/519,484	2/12/85	8/01/83	8/14/90

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b).

4,752,793, Re. S. N. 07/540,192, Filed June 19, 1990, Cl. 354/173.11, CAMERA WITH MOTORIZED FILM REWINDING DEVICE, Masahura Kawamura, et al., Owner of Record: *Canon Kabushiki Kaisha, Tokyo, Japan*, Attorney or Agent: James J. Daley, Ex. Gp.: 211

4,762,316, Re. S. N. 07/563,412, Filed Aug. 7, 1990, Cl. 272/56.5, WAVE SURFING SIMULATION, Dennis Merino, Owner of Record: *Inventor*, Attorney or Agent: Louis J. Bovasso, Ex. Gp.: 354

4,767,537, Re. S. N. 07/562,970, Filed Aug. 6, 1990, Cl. 210/608, DEWATERING OF SLUDGE USING NITRATE, H. Forbes Davis, Owner of Record: *Davis Water & Waste Industries, Inc., Thomasville, Ga.*, Attorney or Agent: Michail J. Keenan, Ex. Gp.: 136

4,722,819, Re. S. N. 07/564,496, Filed Aug. 6, 1990, Cl. 264/177.11, DIE AND PROCESSES FOR MANUFACTURING HONEY COMB STRUCTURES, Christian Bent Lundsager, Owner of Record: *W. R. Grace & Co.-Conn, New York, N. Y.*, Attorney or Agent: Edward J. Cabic, Ex. Gp.: 137

4,744,237, Re. S. N. 07/565,806, Filed May 15, 1990, Cl. 72/367, METHOD OF FORMING BOX-LIKE FRAME MEMBERS, Ivano Cudini, Owner of Record: *TI Corporate Services Limited, London, England*, Attorney or Agent: Conrad J. Clark, Ex. Gp.: 321

4,775,180, Re. S. N. 07/563,563, Filed Aug. 6, 1990, Cl. 160/84.1, AUTOMATIC RETRACTABLE SHADE, Arthur J. Phillips, Owner of Record: *Inventor*, Attorney or Agent: Glenn K. Beaton, Ex. Gp.: 355

4,783,031, Re. S. N. 07/560,834, Filed July 31, 1990, Cl. 248/97, TRASH BAG ASSEMBLY AND HOLDER, Richard M. Ebentheur, Owner of Record: *Inventor*, Attorney or Agent: Alan C. Rose, Ex. Gp.: 355

4,801,585, Re. S. N. 07/562,887, Filed Aug. 3, 1990, Cl. 514/210, CYCLIC CARBOXAMIDE DERIVATIVES AND THEIR USE AS ANALGESICS, Vittorio Vecchietti, et al., Owner of Record: *Dr. Lo. Zambeletti, S.P.A., Milan, Italy*, Attorney or Agent: Jesse D. Reingold, Ex. Gp.: 125

4,814,819, Re. S. N. 07/562,698, Filed Aug. 6, 1990, Cl. 355/290, HEAT-FIXING APPARATUS, Mitsuhiro Torino, et al., Owner of Record: *Hitachi Metals, Ltd., Tokyo, Japan*, Attorney or Agent: Bruce C. Zotter, Ex. Gp.: 215

4,825,547, Re. S. N. 07/563,319, Filed July 27, 1990, Cl. 30/216, PILE CARPET TRIMMER, William E. Carder, Owner of Record: *Inventor*, Attorney or Agent: Inventor, Ex. Gp.: 324

4,833,558, Re. S. N. 07/564,864, Filed July 6, 1990, Cl. 360/106, HEAD POSITIONING ASSEMBLY, Hamid Baheri, Owner of Record: *Archive Corp., Costa Mesa, Calif.*, Attorney or Agent: John B. Sganga, Ex. Gp.: 233

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

4,271,093, Reexam. No. 90/002,101, Requested Aug. 3, 1990, Cl. 361/034.9, CARBURETOR, Takeshi Kobayashi, Owner of Record: *Walbro Far East Co., Kawasaki, Japan*, Attorney or Agent: Robert A. Choate, Barnes, Kisselle, et al., Ex. Gp.: 135, Requester: Kawasaki Jukogyo, Kobe, Japan

4,305,091, Reexam. No. 90/002,107, Requested Aug. 13, 1990, Cl. 358/036, ELECTRONIC NOISE REDUCING APPARATUS AND METHOD, J. Carl Cooper, Owner of Record: *Inventor, Santa Clara, Calif.*, Attorney or Agent: Blanchard, Flynn, Thiel, et al., Ex. Gp.: 262, Requester: US JVC Corp., Elmwood Park, N. J.

4,446,715, Reexam. No. 90/002,106, Requested Aug. 9, 1990, Cl. 073/1R, TRANSDUCER CALIBRATION SYSTEM, Wilber H. Bailey, Owner of Record: *Camino Laboratories, Inc., San Diego, Calif.*, Attorney or Agent: Fulwider, Patton, Lee, et al., Ex. Gp.: 265, Requester: Owner

4,483,723, Reexam. No. 90/002,104, Requested July 23, 1990, Cl. 148/31.500, STEEL WITH ANTIMONY ADDITION, Gregory Lyudkovsky, Owner of Record: *Island Steel Co., Chicago, Ill*, Attorney or Agent: Marshall, O'Toole, Bernstein, et al., Ex. Gp.: 111, Requester: Owner

4,522,610, Reexam. No. 90/002,105, Requested Aug. 10, 1990, Cl. 474/141, GEAR CRANK APPARATUS FOR A BYCYCLE, Masaski Nagano, Owner of Record: *Shimaro Industrial Co., Ltd., Osaka, Japan*, Attorney or Agent: Unknown, Ex. Gp.: 356, Requester: Owner

4,767,308, Reexam. No. 90/002,103, Requested Aug. 6, 1990, Cl. 425/405.1, MOULD FOR MOULDING AN ARTICLE, Alfred A. Adams, Owner of Record: *Group Lotus, Plc., Norfolk, England*, Attorney or Agent: Seidel, Gonda, Lavorgna & Monaco, Ex. Gp.: 135, Requester: Owner

4,773,485, Reexam. No. 90/002,108, Requested Aug. 14, 1990, Cl. 169/065, FIRE EXTINGUISHING SYSTEM FOR COOKSTOVE AND RANGES, Robert R. Silverman, Owner of Record: *21st Century International Fire Equipment & Services Corp., Irving, Tex.*, Attorney or Agent: John R. Moses, Millen &

White, Ex. Gp.: 315, Requester: Raphael A. Monsanto, Ruden, Barnett, et al., Miami, Fla.,

4,798,465, Reexam. No. 90/002,102, Requested Aug. 6, 1990, Cl. 198/432, PARTICLE SIZE DETECTION DEVICE HAVING HIGH SENSITIVITY IN HIGH MOLECULAR SCATTERING ENVIRONMENT, Robert G. Knollenberg, Owner of Record: *Particle Measuring Systems, Inc., Boulder, Colo.*, Attorney or Agent: Harris & Burdick, Ex. Gp.: 317, Requester: Met One, Inc., Grants Pass, Oreg.

4,834,188, Reexam. No. 90/002,109, Requested Aug. 14, 1990, Cl. 169/065, FIRE EXTINGUISHING SYSTEM FOR COOKSTOVE AND RANGES, Robert R. Silverman, Owner of Record: *21st Century International Fire Equipment & Services Corp., Irving, Tex.*, Attorney or Agent: John R. Moses, Millen & White, Ex. Gp.: 315, Requester: Raphael A. Monsanto, Ruden, Barnett, et al., Miami, Fla.,

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Erratum

"All reference to Reexamination Certificate No. B1 4,452,053 (602nd) appearing in the Official Gazette of December 16, 1986, should be deleted since no reexamination certificate has been granted."

Service by Publication

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceedings sent by certified mail to each registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Trend Set Inc., Minden, La., Reg. No. 1,042,983, for the mark "DIG IT", Canc. No. 18,592.

Scott E. Green, Doraville, Ga., Reg. No. 1,383,584, for the mark "YOGI", Canc. No. 18,797.

Graham Software Corp., Kingwood, Tex., Reg. No. 1,453,975, for the mark "INTELLISYS", Canc. No. 18,918.

JEAN BROWN
Administrator,
Trademark Trial and Appeal Board
For JEFFREY M. SAMUELS
Assistant Commissioner
for Trademarks

PATENT NOTICES

Certificates of Correction For Week of September 18, 1990

Re. 32,115	4,850,766	4,867,662	4,874,555
3,816,326	4,851,200	4,867,907	4,875,003
3,888,786	4,851,228	4,868,005	4,875,038
4,666,956	4,851,798	4,868,110	4,875,103
4,745,124	4,852,439	4,868,255	4,875,131
4,750,212	4,853,036	4,868,392	4,875,160
4,753,866	4,854,813	4,868,605	4,875,982
4,763,893	4,855,262	4,868,630	4,876,153
4,777,650	4,855,329	4,868,793	4,876,214
4,783,089	4,855,366	4,869,266	4,876,519
4,800,312	4,856,330	4,869,290	4,876,762
4,807,129	4,858,038	4,869,619	4,876,875
4,808,000	4,858,141	4,869,662	4,877,070
4,815,471	4,858,756	4,870,270	4,877,817
4,822,985	4,859,116	4,870,341	4,877,869
4,824,553	4,860,341	4,870,980	4,878,063
4,826,466	4,861,785	4,871,020	4,878,494
4,826,736	4,862,302	4,871,131	4,878,773
4,826,865	4,863,150	4,871,165	4,878,829
4,827,254	4,863,293	4,871,186	4,878,901
4,828,313	4,863,357	4,871,345	4,879,033
4,832,460	4,863,940	4,871,496	4,879,130
4,833,049	4,863,951	4,871,912	4,879,682
4,834,689	4,864,597	4,872,119	4,879,916
4,834,895	4,864,641	4,872,199	4,880,799
4,835,217	4,864,842	4,872,498	4,881,868
4,835,228	4,865,118	4,872,531	4,881,951
4,837,232	4,865,547	4,872,704	4,882,165
4,841,207	4,865,669	4,872,865	4,883,354
4,841,529	4,865,854	4,873,015	4,883,682
4,843,633	4,865,953	4,873,344	4,886,210
4,845,470	4,865,979	4,873,439	4,887,062
4,848,253	4,866,020	4,873,455	4,887,320
4,848,896	4,866,085	4,873,527	4,908,996
4,848,992	4,866,267	4,873,688	4,916,128
4,849,212	4,866,675	4,873,751	4,925,276
4,849,251	4,867,250	4,873,791	
4,850,699	4,867,443	4,873,899	

Disclaimers

4,022,479.—*David C. Orlowski*, Rock Island, Ill. SEALING RINGS. Patent dated May 10, 1977. Disclaimer filed July 13, 1990, by the inventor.

Hereby enters this disclaimer to claims 1, 2, and 4 of said patent.

4,556,952.—*James A. Brewer*, Delray Beach, Fla.; *Lewis C. Eggebrecht*, Rochester, Minn.; *David A. Kummer; Patricia P. McHugh*, both of Boca Raton, Fla. REFRESH CIRCUIT FOR DYNAMIC MEMORY OF A DATA PROCESSOR EMPLOYING A DIRECT MEMORY ACCESS CONTROLLER. Patent dated Dec. 3, 1985. Disclaimer filed Apr. 12, 1990, by the assignee, International Business Machines Corporation.

The term of this patent subsequent to March 5, 1990, has been disclaimed.

4,600,205.—*Denzil S. Stewart; Alfred J. Bland*, both of Canoga Park; *Donald D. Rogers*, Moorpark, all of Calif. STEERING APPARATUS FOR MOTOR VEHICLES. Patent dated July 15, 1986. Disclaimer filed June 18, 1990, by the assignee, Steering Control Systems, Inc.

Hereby enters this disclaimer to claims 1, 4, 7, 8, 9, 10, 14, and 16 of said patent.

4,614,779.—*Noboru Watanabe*, Yokohama; *Hideyoshi Shomoda*, Kamakura; *Yoichiro Kubo*, Yokohama, all of Japan. OIL-AND HEAT-RESISTANT RUBBER COMPOSITION COMPRISING NITRILE CONTAINING RUBBER AND FLOURINE CONTAINING RUBBER. Patent dated Sept. 30, 1986. Disclaimer filed June 8, 1990, by the assignee, Nippon Zeon Co., Ltd.

Hereby enters this disclaimer to the remaining term of said patent.

4,700,924.—*John E. Nelson*, Houston; *Raymond J. Smith*, Friendswood, both of Tex. PRESSURE ENERGIZED ROTARY HYDRAULIC SEAL. Patent dated Oct. 20, 1987. Disclaimer filed Mar. 30, 1990, by the assignee Vetco Gray Inc.

Hereby enters this disclaimer to claims 1-3 of said patent.

4,816,588.—*William F. Rieker*, Plainsboro; *William A. Daniels*, Belle Mead, both of N.J. METHOD FOR THE PREPARATION OF PYRIDINE-2, 3-DICARBOXYLIC ACIDS. Patent dated Mar. 28, 1989, Disclaimer filed Oct. 12, 1989, by the assignee, American Cyanamid Company.

The term of this patent subsequent to October 10, 1989, has been disclaimed.

4,888,647.—*Kanji Wada*, Osaka, Japan. IMAGE RECORDING APPARATUS WITH IMPROVED SOS DETECTION. Patent dated Dec. 19, 1989. Disclaimer filed April 13, 1990, by the assignee, Minolta Camera Kabushiki Kaisha.

Hereby enters this disclaimer to claims 7 through 13 of said patent.

Dedication

Re. 30,322.—*Clarence F. Hammer*, Wilmington, Del; *Harold K. Sinclair*, Louisville, KY. NOVEL ELASTOMERIC GRAFT COPOLYMERS. Patent dated July 1, 1980. Dedication filed April 16, 1986, by the assignee, E. I. du Pont de Nemours and Company.

Hereby dedicates to the Public the remaining term of said patent

Disclaimers and Dedications

4,851,305.—*William H. Kump*, St. Paul; *Richard M. Sahli*, Cottage Grove, both of Minn. COVER ASSEMBLIES FOR ELECTRIC STORAGE BATTERIES AND BATTERIES UTILIZING SUCH COVER ASSEMBLIES. Patent dated July 25, 1989. Disclaimer and Dedication filed June 7, 1990, by the assignee, GNB Incorporated.

Hereby disclaims and dedicates to the Public the remaining term of said patent.

4,896,601.—*Willi Jeschke*, Bad Herrenalb, Fed. Rep. of Germany. INKING UNIT FOR ROTARY PRINTING PRESSES. Patent dated Jan. 30, 1990. Disclaimer and Dedication filed July 3, 1990, by the assignee, Heidelberger Druckmaschinen Aktiengesellschaft.

Hereby disclaims and dedicates to the Public claims 1-4 and 11-14 of said patent.

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Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

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PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner
CONDITION OF PATENT APPLICATIONS AS OF July 28, 1990

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director.	7-7-87
ORGANIC CHEMISTRY GROUP 120—JOHN F. TERAPANE, JR., Director.	11-21-88
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP— 130 BARRY S. RICHMAN, Director	5-12-88
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	8-3-88
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director	1-28-87
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COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP— 260 STEWART LEVY, Acting Director	4-22-88
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MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	10-25-88
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director.	3-16-89
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350— A. L. SMITH, Director	8-15-89

Expiration of patents: The patents within the range of numbers indicated below expire during July 1990 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,742,517 to 3,750,191 inclusive
Plant Patents ..... 3,370 to 3,384 inclusive

REEXAMINATIONS

SEPTEMBER 18, 1990

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 Re. 32,521 (1353rd)

LIGHT MODULATOR DEMODULATOR AND METHOD OF COMMUNICATION EMPLOYING THE SAME

James L. Fergason, 90 Adam Way, Atherton, Calif. 94025

Reexamination Request No. 90/001,777, Jun. 2, 1989.

Reexamination Certificate for Reissue Patent Re. 32,521, issued Oct. 13, 1987, Ser. No. 710,846, Mar. 12, 1985.

Original No. 4,436,376, dated Mar. 13, 1984, Ser. No. 235,006, Feb. 17, 1981. Continuation-in-part of Ser. No. 121,071, Feb. 13, 1980, Pat. No. 4,385,806, which is a continuation-in-part of Ser. No. 913,618, Jun. 8, 1978, abandoned.

Int. Cl.[5] **G02F** *1/13, 1/00, 2/00;* **H01S** *3/00*

U.S. Cl. 350—334

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–31, 52** and **54–56** is confirmed.

Claims **32, 42–44, 50, 53** and **57–59** are determined to be patentable as amended.

Claims **33–41, 45–49** and **51**, dependent on an amended claim, are determined to be patentable.

New claims **60–156** are added and determined to be patentable.

1. A light modulator comprising at least one liquid crystal cell comprising two parallel transparent plates; a transparent electrical conductive layer applied to the confronting surfaces of the said two plates; each said conductive layer having parallel surface alignment, the said alignment of the two adjoining surfaces being parallel; a continuous layer of nematic liquid crystal having positive dielectric anisotropy between the two electrical conducting coatings;

means for applying a fixed electrical bias to the two said electrical conducting coatings;

means for applying an amplitude modulated oscillatory electrical signal having a frequency greater than 10 hertz across the said continuous layer;

a source of polarized light directed through the said two transparent plates;

whereby the light which passes through the said two transparent plates is a phase-shifted beam which is distinguishable from the light from the said source in a manner which corresponds to the said oscillatory electrical signal.

32. A method for controlling polarized *multicolor* light comprising:

(a) establishing a film of nematic liquid crystal having positive dielectric anisotropy between two parallel surfaces and imparting a first generally parallel surface orientation to the said liquid crystal film at the said surfaces;

(b) establishing a second bulk orientation of the bulk of the liquid crystal in a direction which is different from the said first generally parallel orientation of the liquid crystal at the said surfaces;

(c) applying a varying electrical signal to said surfaces to alter the relative direction of the alignment of the liquid crystal between the said surface orientation and the said bulk orientation;

(d) passing polarized light through said film to generate light which is phase shifted in a manner corresponding to the said varying electrical signal; *and*

wherein said step of applying a varying electrical signal comprises applying such electrical signal to effect phase shifting of such polarized light without significant color dispersion thereby to permit on-off modulation of said multicolor light.

B1 3,957,084 (1354th)

DEVICE FOR CARRYING FLEXIBLE CABLES OR PIPES FROM A FIXED CONNECTION POINT TO A MOBILE CONSUMER BY MEANS OF A FLEXIBLE TUBE

Werner Jung, Rheydt, Fed. Rep. of Germany, assignor to Kabelschlepp AG, Zug, Switzerland

Reexamination Request No. 90/000,900, Nov. 6, 1985.

Reexamination Certificate for Patent No. 3,957,084, issued May 18, 1976, Ser. No. 441,104, Feb. 11, 1974.

Claims priority, application Fed. Rep. of Germany, Feb. 14, 1973, 7305486

Int. Cl.[5] **F16L** *11/00*

U.S. Cl. 138—136

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim **1** is determined to be patentable as amended.

Claims **2–16** dependent on an amended claim, are determined to be patentable.

New claims **17** and **18** are added and determined to be patentable.

1. A device for carrying flexible cables or pipes from a fixed connection point to a mobile load, said device comprising a flexible support tube capable of bending into an arcuate curve about a bending axis spaced laterally from the tube, said flexible support tube being formed from a profiled strip having two oppositely facing, side-by-side channels formed therein, each channel having an outer sidewall, and both channels having a common inner sidewall, said strip being spirally wound on itself with the outer sidewall of each channel extending into the oppositely facing channel of the adjoining winding; and means provided along one side of said flexible tube for [maintaining said one side at a constant length; the other side of said tube being variable in length] *preventing said one side from expanding or contracting while permitting the opposite side to expand or contract a limited amount* to accommodate itself to the circumference of an arc following the surface of said [other] *opposite* side and having its center at said bending axis.

17. A device for carrying flexible cables or conduits from a fixed connection point to a mobile load, said device comprising a flexible support tube capable of bending into an arcuate curve about a bending axis spaced laterally from the tube, said flexible support tube being formed from a profiled strip having two oppositely facing, side-by-side channels formed therein, each channel having an outer side wall and both channels having a common inner side wall, said strip being spirally wound on itself to form a plurality of windings, each presenting an inner surface and and outer surface with the outer side wall of each channel extending into the oppositely facing channel of the adjoining winding so that said outer side wall can move within the channel of the adjoining winding to enable said tube to be extended and compressed a limited amount; and means attached to the surfaces of said windings along one side of said flexible tube for preventing the movement of said windings relative to each other along said one side and thereby preventing said one side of said tube from expanding or contracting while permitting the other side of said tube to expand or contract a limited amount to accommodate itself to the circumference of an arc following the surface of said other side and having its center at said bending axis.

B1 4,540,243 (1355th)

METHOD AND APPARATUS FOR CONVERTING PHASE-MODULATED LIGHT TO AMPLITUDE-MODULATED LIGHT AND COMMUNICATION METHOD AND APPARATUS EMPLOYING THE SAME

James L. Ferguson, 5806 Horning Rd., Kent, Ohio 44240

Reexamination Request No. 90/001,778, Jun. 2, 1989.
Reexamination Certificate for Patent No. 4,540,243, issued Sep. 10, 1985, Ser. No. 409,526, Aug. 19, 1982.
Int. Cl.[5] G02F 1/13
U.S. Cl. 350—337

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–13** and **15–20** is confirmed.

Claim **14** having been finally determined to be unpatentable, is cancelled.

New claims **21–36** are added and determined to be patentable.

1. A light transmitter comprising

at least one liquid crystal cell comprising two parallel transparent plates; a transparent electrical conductive layer applied to the confronting surfaces of the said two plates; each said conductive layer having parallel surface alignment, the said alignment of the two adjoining surfaces being parallel; a continuous layer of nematic liquid crystal having positive dielectric anisotropy between the two electrical conducting coatings;

means for applying a fixed electrical bias to the two said electrical conducting coatings;

means for applying an amplitude modulated oscillatory electrical signal across the said continuous layer; a source of polarized light directed through the said two transparent plates;

whereby the light which passes through the said two transparent plates is a phase-shifted beam which is distinguishable from the light from the said source in a manner which corresponds to the said oscillatory electrical signal; and

a linear polarizer for converting said phase-shifted beam to a light beam whose amplitude corresponds to said oscillatory electrical signal.

REISSUES

SEPTEMBER 18, 1990

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

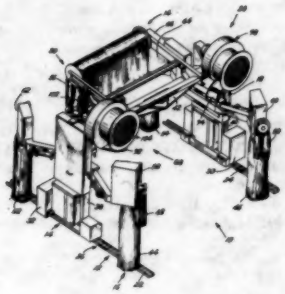
Re. 33,334
VEHICLE WASH AND DRYER

James A. Nelson, Des Moines, Iowa, assignor to Ryko Manufacturing Company, Grimes, Iowa

Original No. 4,685,169, dated Aug. 11, 1987, Ser. No. 769,666, Aug. 26, 1985. Application for reissue Oct. 18, 1988, Ser. No. 259,339

Int. Cl.[5] B60S *3/06*

U.S. Cl. 15—302 **9 Claims**



2. An apparatus for washing and drying an automotive vehicle comprising, in combination:

a gantry for moving along said vehicle, [sand] *said* gantry separating said apparatus into entry and exit sections;

water outlet means, mounted on said gantry, for wetting said vehicle;

[two blowers] *dryer means*, mounted on said gantry, for expelling air;

[a nozzle] *at least two nozzles* on [each of said blowers] *said dryer means*, each of said nozzles defining an orientation and directing air from [one of said blowers] *said dryer means* in a direction substantially parallel with said orientation, one of said nozzles oriented toward said entry section of said apparatus and another of said nozzles oriented toward said exit section of said apparatus; and

oscillation means, interconnected to both of said nozzles, for changing said orientation of each of said nozzles and thereby changing said direction of said air from [each of] said [blowers] *dryer means*, whereby air is directed by each of said nozzles toward said vehicle from changing directions in order to substantially dry the sides and top of said vehicle.

Re. 33,335
DEVICE FOR ATTACHING A TOOL

Josef Gentischer, Weinstadt, and Boris Rudolf, Stuttgart, both of Fed. Rep. of Germany, assignors to C. & E. Fein GmbH & Co., Stuttgart, Fed. Rep. of Germany

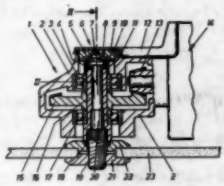
Original No. 4,597,227, dated Jul. 1, 1986, Ser. No. 680,194, Dec. 10, 1984. Application for reissue Jun. 29, 1988, Ser. No. 213,180

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1984, 3405885; Apr. 14, 1984, 3414148; Aug. 30, 1984, 3431901

Int. Cl.[5] B24B *23/02*

U.S. Cl. 51—168 **41 Claims**

1. Apparatus for attaching a tool in portable angled grinders comprising a motor; angular drive means, and a securing station for the tool; said angular drive means comprising a pinion, a beveled cogwheel, and a hollow driveshaft having an axis; a spindle positioned in said driveshaft; housing means for housing said drive means; displacing means, said spindle being positioned in said driveshaft so that it cannot rotate *relative to the driveshaft* but can be displaced axially from outside said housing means by said displacing means; activating means in said displacing means; traveling means and a terminal component, said spindle having an appendage; resilient means between a face of said driveshaft and said appendage on said spindle, said activating means in said displacing means acting



[through said traveling means at an angle to the axis of said driveshaft] on said terminal component against a force of said [resilinet] *resilient* means *by use of surface of said traveling means, said surface being inclined at an angle to the axis of said driveshaft*; said [driveshaft] *spindle* having a threaded pin; a nut screwed onto said threaded pin; a bushing-shaped cover on said driveshaft for limiting travel so that said nut screwed onto said threaded pin on said [driveshaft] *spindle* is lifted away from the tool.

Re. 33,336
CHANGE SPEED TRANSMISSION

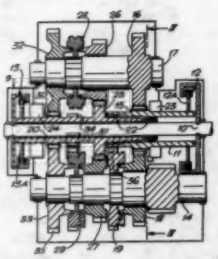
Wilfred N. Bainbridge, Banbury, and Alastair J. Young, Kenilworth, both of United Kingdom, assignors to Automotive Products plc, Warwickshire, England

Original No. 4,627,301, dated Dec. 9, 1986, Ser. No. 713,284, Mar. 18, 1985. Application for reissue Jun. 1, 1988, Ser. No. 200,957

Claims priority, application United Kingdom, Mar. 16, 1984, 84069

Int. Cl.[5] F16H *3/08, 3/04*

U.S. Cl. 74—330 **11 Claims**



1. A change speed transmission including gear trains which provide increasing speed ratios and two clutches [which are] *having respective driving and driven members, the clutches being*

independently operable [and] provide alternative drive paths through the gear trains between an input and output, the gear trains providing alternate ratios driven respectively through one and the other clutch said input comprising *a drive input shaft for the driving members of the clutches,* a first shaft *coaxial with the drive input shaft and* rotatably fast with a driven member of one *said* clutch and a second shaft *coaxial with the first shaft and* rotatably fast with a driven member of the other clutch, *the output comprising an output shaft through which drive is transmitted in all ratios and which has gearing thereon in constant mesh with gearing on at least one of the first and second shafts,* a layshaft being provided [*through which*] *having an axis spaced from the axis of the output shaft and having gearing thereon in constant mesh with gearing on the first and second shaafts whereby* drive in a selected ratio is transmitted from one of the first and second shafts *to the layshaft, through the layshaft* to the other of the first and second shafts *and from the other of the first and second shafts* to drive the output [, one of the first and second shafts having a gear thereon which meshes with a gear on the output] *shaft.*

Re. 33,337

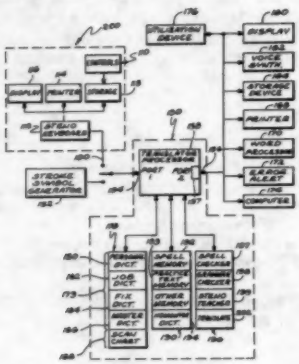
STENOGRAPHIC TRANSLATION SYSTEM

Jerrold P. Lefler, Hidden Hills, Calif., and Scott Woodard, Arlington Heights, Ill., assignors to Digitext, Inc., Thousand Oaks, Calif.

Original No. 4,724,285, dated Feb. 9, 1988, Ser. No. 942,068, Dec. 17, 1986. Continuation of Ser. No. 795,944, Nov. 7, 1985, abandoned. Application for reissue Dec. 20, 1988, Ser. No. 287,788

Int. Cl.[5] H04L *3/00*

U.S. Cl. 178—21 **46 Claims**



40. A steno translator system for translating lexical stroke symbols into language format in accordance with a predefined stenographic methodology, each lexical stroke symbol defined by at least one character from a character set comprising consonants and vowels, the system comprising:

stroke symbol means for providing a sequence of lexical stroke symbols, each lexical stroke symbol defined by at least one of a left consonant part comprising at least one consonant character, a vowel part comprising at least one vowel character, and a right consonant part comprising at least one consonant character;

processor means coupled for receiving the lexical stroke symbols from the stroke symbol means, comprising:

a scan chart memory for storing a selected list of chart entries, the list comprising a left consonant sublist, a vowel sublist and a vowel/right consonant sublist, each entry having stored in association therewith a language part defining a translation of the chart entry; and

translator means comprising comparing means for comparing the left consonant part of selected lexical stroke symbols having a left consonant part against the left consonant sublist to find a match, the language part associated with the matched member of the left consonant sublist defining a left consonant translation, comparing the vowel part of selected lexical stroke symbols having a vowel part but no right consonant part against the vowel sublist to find a match, the language part associated with the matched member of the vowel sublist defining a vowel translation, and comparing the combined vowel part and right consonant part of selected lexical stroke symbols having a right consonant part against the vowel/right consonant list to find a match, the language part associated with the matched member of the vowel/right consonant sublist defining a vowel/right consonant sublist defining a vowel/-right consonant translation; and

means for combining the left consonant, vowel and vowel/-right consonant translations to define a stroke symbol translation from the scan chart memory.

Re. 33,338

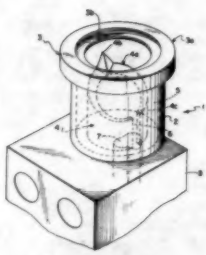
MEMBRANE SEAL AND KNIFE COMBINATION FOR A POST-MIX BEVERAGE DISPENSING SYSTEM

Jason K. Sedam, Dunwoody, Ga., assignor to The Coca-Cola Company, Atlanta, Ga.

Original No. 4,426,019, dated Jan. 17, 1984, Ser. No. 311,645, Oct. 15, 1981. Application for reissue Jan. 16, 1986, Ser. No. 819,425

Int. Cl.[5] B67B *7/24*

U.S. Cl. 222—88 **26 Claims**



1. An opening device to be used in a post-mix beverage dispenser, together with a disposable syrup container, said container having a neck portion with an opening sealed by a rupturable membrane from which said syrup will flow when said membrane is ruptured, said device comprising a cylindrical piercing means surrounded by a cylindrically-shaped socket member, said socket member having a discharge port at the bottom thereof, said piercing means and socket member forming an annular compartment surrounding said discharge port defined by the outer wall of said cylindrical piercing means and the inner wall of said socket member for receipt of the neck of said container, *said piercing means and said neck being substantially concentric when the neck is in said socket, the diameter of the outer wall of said piercing means being only slightly less than the diameter of the inner wall of said neck, providing minimum clearance between the piercing means and the neck, and the inner wall of said neck and the outer wall of said piercing means being parallel,* and drainage means through said outer wall of said piercing means for permitting syrup flow from said annular compartment to said discharge port, said piercing means having an angular truncated cutting edge with a pyramidal piercing element on the apex thereof, said socket member being provided with a seal for securely receiving the neck of said syrup container into the compartment formed between said piercing means and socket member.

Re. 33,339

CHAIN FOR SUPPORTING ENERGY CONVEYING MEANS, AND CHAIN LINK THEREFOR

Klaus Heidrich, Siegen; Alfred Krewitt, Kreutzal; Kurt Loos, Dreis-Tiefenbach, and Fritz Ipithan, Huttental-Weidenau, all of Fed. Rep. of Germany, assignors to Kabelschlepp Gesellschaft mit Beschrankter Haftung, Siegen, Fed. Rep. of Germany

Original No. 3,664,619, dated May 23, 1972, Ser. No. 49,347, Jun. 24, 1970. Application for reissue May 27, 1980, Ser. No. 153,799

Claims priority, application Fed. Rep. of Germany, Jun. 26, 1969, 1932428

Int. Cl.[5] F16L *3/00*

U.S. Cl. 248—51 **22 Claims**

1. A power-line supporting chain for supporting energy conveying means, especially power lines and hoses, which includes a plurality of chain links pivotally connected to each other, each of said links being H-shaped and having two oppositely located and substantially parallel plate-shaped arms [and a transverse] *integrally formed with* wall [transverse] *means extending transversely* to the longitudinal extension of said arms and interconnecting the same at an area between the ends of said arms, *said transverse wall means defining at least one transverse opening in each link adapted to receive energy conveying means for retention between said arms,* each of said arms being laterally elastically yieldable relative to the other arm in a direction transverse to the longitudinal plane of symmetry of the respective link and having two sections connected to each other at the region of said transverse wall [while] *means,* one of said sections of each arm [is] *being* provided with a bore and the pertaining other section of the same arm [is] *being* provided with a stud having an outer diameter corresponding to a slide fit for said bore, said chain links being arranged so that the studs of one chain link pivotally engage the bores of the respective next following link while the bores of said one chain link are pivotally engaged by the studs of the respective next preceding link, the end portion of each side plate which bears the stud being offset from the end portion of the side plate which contains the [hole] *bore.*

Re. 33,340

COLOR PRINTER HAVING APPARATUS FOR SHIFTING INK RIBBON

Tetsuo Tsukada, Kawasaki; Hideyuki Shimobuchi, Akishima, and Takahiro Yoshikawa, Sagamihara, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Original No. 4,695,175, dated Sep. 22, 1987, Ser. No. 788,566, Oct. 17, 1985. Application for reissue Apr. 28, 1988, Ser. No. 187,632

Claims priority, application Japan, Oct. 23, 1984, 59-222607

Int. Cl.[5] B41J *32/02*

U.S. Cl. 400—196.1 **25 Claims**

18. A color printer, comprising:

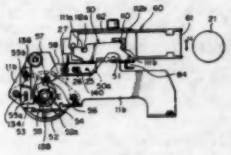
a base unit;

a platen mounted on said base unit for supporting a printing paper;

a printing head;

a carrier reciprocally movable along said platen for supporting said printing head to reciprocally move said printing head along a printing line on the printing paper on said platen;

a supporting member mounted on said base unit for detachably and swingably supporting a color ink ribbon cassette, said color ink ribbon cassette comprising a cassette case for accommodating therein a color ink ribbon which has a plurality of different color longitudinal stripes so that at least a part of said ink ribbon forms a loop exposed from and extending to the cassette case, which ribbon loop is positioned along said platen and between said printing head and platen, when the color ink ribbon cassette is set on said supporting member;



a ribbon guide member slidably mounted on said carrier for supporting said ink ribbon at a position adjacent to said printing head;

slide shifting means for slide shifting said ribbon guide member so that a desired one of said color stripes of the ink ribbon is positioned on said printing line; and

swing shifting means for swing shifting said color ink ribbon cassette so that the position of the cassette case substantially follows that of the shifted position of the ink ribbon , said swing shifting means being driven in accordance with said slide shifting means.

Re. 33,341

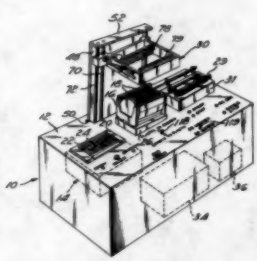
WAFER TRANSFER APPARATUS

Steven N. Lee, and Jae Y. Kim, both of Irvine, Calif., assignors to ASQ Technology, Inc., San Clemente, Calif.

Original No. 4,568,234, dated Feb. 4, 1986, Ser. No. 496,832, May 23, 1983. Application for reissue Jul. 31, 1987, Ser. No. 80,437

Int. Cl.[5] B65G *65/30*

U.S. Cl. 414—404 **21 Claims**



18. Apparatus for transferring a batch of thin, disk-like elements, such as semiconductor wafers, from one slotted carrier to another, wherein the flat faces of the wafers are leaning at a slight angle with respect to vertical in at least one of said carriers tending to arrange said wafers in a uniformly spaced parallel relation, said apparatus comprising:

a support surface for supporting a first slotted carrier adapted to carry a batch of wafers arranged in edgewise, parallel relation;

a wafer transfer assembly located above said surface so that it may be positioned above either carrier, for receiving and

supporting said wafers at said angle with respect to vertical, said assembly including a pair of horizontally oriented and elongated jaws movable into open or closed position, said jaws having a series of spaced slots oriented at said angle for receiving the edges of said wafers; and

means for controlling said jaws of said assembly so that said batch of wafers is aligned with the slots in the first and therefor the second carrier at time of wafer transfer by said assembly.

Re. 33,342

LIQUID CRYSTAL ALIGNING AGENT FROM TETRACARBOXYLIC ACID DIANHYDRIDE, DIAMINE AND MONOAMINE

Noriaki Kohtoh; Toyohiko Abe, and Hiroyoshi Fukuro, all of Ichihara, Japan, assignors to Nissan Chemical Industries Ltd., Tokyo, Japan

Original No. 4,749,777, dated Jun. 7, 1988, Ser. No. 60,515, Jun. 11, 1987. Application for reissue Sep. 1, 1988, Ser. No. 239,336

Claims priority, application Japan, Jun. 18, 1986, 61-142099

Int. Cl.[5] C08G *73/10, 69/04*

U.S. Cl. 528—351 **11 Claims**

1. A liquid crystal aligning agent consisting essentially of a polyimide resin obtained by the polymerization of a diamine, a tetracarboxylic acid dianhydride and a monoamine of the formula:

$$R^2(R^1)_nNH_2 \quad (I)$$

wherein R^1 is a divalent organic group, R^2 is an alkyl group having from 6 to 20 carbon atoms, and n is 0 or 1.

Re. 33,343

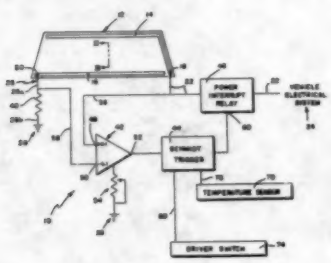
CRACK DETECTOR FOR ELECTRICALLY CONDUCTIVE WINDSHIELD

Lowell E. Bitter, Holland, and Bryan L. Lundgren, South Haven, both of Mich., assignors to Donnelly Corporation, Holland, Mich.

Original No. 4,565,919, dated Jan. 21, 1986, Ser. No. 620,687, Jun. 14, 1984. Application for reissue Jan. 11, 1988, Ser. No. 141,918

Int. Cl.[5] H05B *1/02*; B60L *1/02*

U.S. Cl. 219—509 **18 Claims**



13. An improved electrically conductive panel assembly including a panel having an electrically conductive element, circuit means for conducting direct current through the element, and switch means for controlling the current passing through said circuit means, wherein the improvement comprises said switch means comprising:

a controllable switch coupled in series with said circuit means, said controllable switch being actuable between first and second states and including a control terminal;

current signal means for providing a signal indicative of the current passing through the element;

voltage signal means for providing a signal indicative of the voltage across the element;

calculator means responsive to said current signal means and said voltage signal means for producing an output indicative of the resistance of the element; and

control means responsive to said calculator means and coupled to said control terminal for actuating said controllable switch from one of the states to the other of the states when the resistance of the element is unacceptable.

Re. 33,344

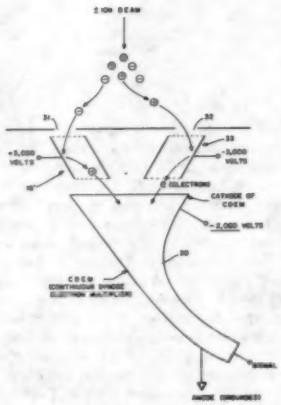
APPARATUS AND METHOD FOR DETECTING NEGATIVE IONS

George C. Stafford, San Jose, Calif., assignor to Finnigan Corporation, San Jose, Calif.

Original No. 4,423,324, dated Dec. 27, 1983, Ser. No. 59,961, Jul. 23, 1979. Continuation of Ser. No. 897,150, Apr. 18, 1978, abandoned. Application for reissue Dec. 24, 1985, Ser. No. 813,880

Int. Cl.[5] H01J *43/00, 49/02*

U.S. Cl. 250—281 **22 Claims**



8. Apparatus for detecting the abundance of negative ions from a source of such ions comprising: conversion dynode means maintained at a high positive voltage for attracting and accelerating only said negative ions whereby the negative ions impact the conversion dynode means with sufficient kinetic energy to produce a substantially proportional amount of secondary positive ions, and electron multiplier means having an input operated at a potential to attract said secondary positive ions and for providing an output signal indicative of the abundance of said negative ions.

Re. 33,345

TOROID TRANSFORMERS AND SECONDARY WINDINGS

Robert D. Sylvester, Jr., Dover; Paul C. Horn, Somersworth, and Vincent J. Bober, Rochester, all of N.H., assignors to GFS Manufacturing Company, Inc., Dover, N.H.

Original No. 4,631,511, dated Dec. 23, 1986, Ser. No. 707,135, Mar. 1, 1985. Application for reissue Jun. 30, 1987, Ser. No. 68,633

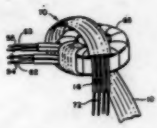
Int. Cl.[5] H01F *27/28*

U.S. Cl. 336—180 **16 Claims**

9. In a toroid transformer having an annular core of permeable material about which radially is wound a toroidal primary winding, and about which radially is wound at least one toroidal secondary winding;

the improvement wherein at least the secondary winding comprises a flat, multifilar strap which includes a plurality of

filaments arranged in substantially parallel, coplanar relationship, and elongate strip means of electrically insulating material underlying and overlying the plurality of filaments, the flat, multifilar strap secondary winding providing for maintaining the substantially parallel, coplanar relationship of the filaments without crossover during radial toroidal winding about curved or irregular toroid surfaces, and providing electrical insulation between turns of the multifilar strap



secondary winding and between the secondary and primary windings.

PLANT PATENTS

GRANTED SEPTEMBER 18, 1990

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,326

ROSE PLANT—LAVJACK VARIETY

Keith Laver, Caledon East, Canada, assignor to The Conard-Pyle Company, West Grove, Pa.

Filed Apr. 27, 1989, Ser. No. 343,869
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—10 **1 Claim**

1. A new and distinct variety of Miniature rose plant characterized by the following combination of characteristics:

(a) forms in abundance on a continuous basis attractive fully double long lasting blossoms which are of a very stable orange-red coloration,

(b) forms small foliage,

(c) exhibits a bushy growth habit,

(d) exhibits good disease resistance, and

(e) is well suited for greenhouse production as a pot plant; substantially as herein shown and described.

7,327

APPLE TREE NAMED 'BENIFUJI'

Tsuneo Murakami, Aomori, Japan, assignor to Hideki Otani, Reedley, Calif.

Filed Nov. 21, 1988, Ser. No. 274,501
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—34 **1 Claim**

1. A new and distinct apple tree substantially as shown and described, particularly characterized by fruit which has less skin russet than Kitanosachi variety but a color, eating quality and maturing time resembling Fuji.

7,328

APPLE TREE: EARLY SPUR ROME

Wilfred M. Berger, Quincy, Wash., assignor to Columbia and Okanagan Nursery Company, Wenatchee, Wash.

Filed Jan. 23, 1989, Ser. No. 299,947
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—34 **1 Claim**

1. A new and distinct variety of apple tree, substantially as herein shown and described, characterized by its dense foliage and fruit which takes on a red color early in its development and which ripens early.

7,329

GAZANIA PLANT CALLED 'MITSUWA BETTER WHITE'

Janet N. Egger, Ventura, and Stephen H. Beimel, Agoura, both of Calif., assignors to Mitsuwa Nursery, Inc., Moorpark, Calif.

Filed May 10, 1989, Ser. No. 349,859
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of Gazania are described and illustrated, particularly characterized by its floriferous showy clear white flowers, green foliage, vigorous growth, and trailing habit.

7,330

AFRICAN VIOLET PLANT NAMED IMPROVED SOUTH CAROLINA

Reinhold Holtkamp, Sr., Blumenstrasse 28, D 4242 Rees-Haffen, Fed. Rep. of Germany

Filed Jun. 8, 1989, Ser. No. 363,464
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—69 **1 Claim**

1. A new and distinct cultivar of African violet named Improved South Carolina, as described and illustrated, and particularly characterized by its shiny white, star-shaped flowers with slightly wavy edges; occasional purplish blue touch in the center; strong, upright flower stems that curve slightly toward the center to form a compact bouquet above the leaves; medium green, oval, slightly serrated leaves; profuse flowering, vigorous and compact growth habit, flowering 10–11 weeks after potting, and its long lasting and non-dropping flowers.

7,331

AFRICAN VIOLET PLANT NAMED EVERGLADES

Reinhold Holtkamp, Sr., Blumenstrasse 28, D 4242 Rees-Haffen, Fed. Rep. of Germany

Filed Jun. 8, 1989, Ser. No. 363,465
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—69 **1 Claim**

1. A new and distinct cultivar of African violet named Everglades, as described and illustrated, and particularly characterized by its single violet-shaped to semi-double, blue flowers with frilled edges; strong, upright flower stems that curve slightly toward the center to form a compact bouquet above the leaves; large medium green leaves, profuse flowering, vigorous growth habit, flowering 10–11 weeks after potting, and its long lasting and non-dropping flowers.

7,332

CHRYSANTHEMUM PLANT NAMED SALMON SPLENDOR

Betty C. Callahan, Waleska, Ga., assignor to Callahan's Greenhouses, Inc., Waleska, Ga.

Filed Jun. 13, 1989, Ser. No. 365,473
Int. Cl.[5] A01H *5/00*
U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct Chrysanthemum plant named Salmon Splendor, as described and illustrated.

PATENTS

GRANTED SEP. 18, 1990

ERRATA

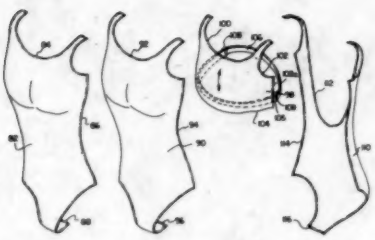
For CLASS	See PATENT NO.
019-035	4,956,896
413-008	4,956,906
049-381	4,956,954
089-001	4,957,027
089-047	4,957,028
134-167	4,957,123
248-296	4,957,186
277-217	4,957,212
272-117	4,957,281
272-073	4,957,282
270-037	4,957,284
148-013	4,957,543
203-051	4,957,595
201-020	4,957,596
198-831	4,957,597
162-363	4,957,598
162-078	4,957,599
160-199	4,957,600
156-665	4,957,601
250-208	4,957,659
264-001	4,957,663
424-050	4,957,686
514-252	4,957,971
328-155	4,958,120
355-053	4,958,160
357-084	4,958,222
368-282	4,958,279
357-072	4,958,372

PATENTS

GRANTED SEPTEMBER 18, 1990

GENERAL AND MECHANICAL

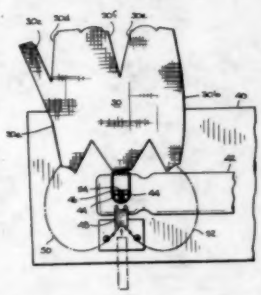
4,956,878
SWIM SUIT CONSTRUCTION
Nancy V. Boynton, 5814 Vestavia Dr., Houston, Tex. 77069
Division of Ser. No. 117,488, Nov. 5, 1987. This application Aug. 16, 1989, Ser. No. 394,476
Int. Cl.[5] A41D *7/00*
U.S. Cl. 2—67 **5 Claims**



1. A swim suit construction for securely supporting a female while allowing freedom of movement, comprising:
- a front outer shell of stretch fabric having an upper edge, side edges, and a lower edge;
- a front liner of stretch fabric having the same general shape as said front outer shell, said liner being attached to said front outer shell along said upper edge, side edges and bottom edge;
- a bra of two-way vertically stretchable fabric positioned on the side of said front liner remote from said front shell, said bra having upper, lower and side edges attached along said upper edges to said outer shell and liner;
- a rear outer shell of four-way stretch fabric having an upper edge, side edges and a bottom edge, said rear outer shell being attached along portions of said top, side and bottom edges to said front shell and liner and cooperating therewith to provide a body enclosure having arm, neck and leg openings; and
- said bra extending below said arm openings and being attached to said front and rear shells and said front liner along said side edges thereof below said arm openings, said bra being exposed to the interior of said swim suit;
- an elastic loop means providing a front half attached to said bra along said bottom edge thereof and to said side edges of said liner and said front and back shells;
- said elastic loop means providing a rear half cooperating with said front half to encircle a female body and hold the lower portion of said bra against the body of such a female;
- said lower edge of said bra and elastic loop means being free of connections with said front and rear shells and said liner except along said side edges thereof;
- said front liner and said shell being stretchable at least in the direction toward said side edges.

4,956,879
GARMENT HAVING SEAMLESS BODY
Marvin Adams, Sylva, N.C., assignor to Meltzer Industries Corporation, New York, N.Y.
Filed Apr. 18, 1989, Ser. No. 339,529
Int. Cl.[5] A41D *10/00*
U.S. Cl. 2—80 **3 Claims**

1. A method of making a garment having a seamless body portion, said method comprising the steps of:
- a. cutting a piece of fabric to the pattern of a one-piece body portion of a garment,
- b. positioning said cut piece of fabric face down on a sewing machine table behind the needles of a two-needle sewing machine mounted on said table, the sides of said cut piece of fabric disposed on opposite sides of the needles,
- c. drawing the sides of the cut piece of fabric forwardly on opposite sides of the needles while preventing any contact between the said cut piece of fabric and the said needles,



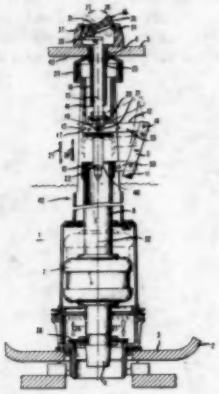
- d. then turning said sides of the cut piece of fabric toward the needles and feeding said sides to the needles,
- e. concurrently feeding a slide fastener to the needles,
- f. thereby sewing the slide fastener to the sides of the cut piece of fabric to form a closure between said sides, and
- g. finally completing the garment by attaching sleeves to the seamless body portion.

4,956,880
ACTUATING DEVICE FOR MOVING A VALVE FOR EMPTYING A FLUSH TANK
Jean-Claude Bailet, Villefranche, France, assignor to Siamp Cedap S.A., Monaco
Filed Jun. 5, 1989, Ser. No. 365,134
Claims priority, application France, Oct. 5, 1987, 87 13720
Int. Cl.[5] E03D *1/34*
U.S. Cl. 4—413 **17 Claims**

1. A discharge-valve actuating device for a flush tank reservoir comprising
- a reservoir tank having an open top and having a bottom;
- a cover lid having a central opening for positioning and supporting the operating member and mating the top of the reservoir tank;
- a vertically disposed tube;
- a valve supported by the vertical tube;
- an operating member pivotally mounted on said tank exterior for providing a first operating position corresponding to an open position of the valve, and for providing a second operating position corresponding to a closed position of the valve;
- a body mounted solidly to the bottom of the reservoir tank and wherein the vertical tube is shiftable in axial direction in the body;
- a case solidly attached to the body and to the reservoir tank;
- a linking rod pivotably attached to the tube and disposed at an angle relative to the axis of the tube and constructed to transfer the vertical motion of said tube;
- an operating lever pivotably attached at one end via a first pivot axis first pivot axis to the linking rod and pivotally attached to the body at the other end and having an elongated opening between said pivot axis; a control rod dis-

posed substantially in the axis of the tube and mechanically connected, on the one hand, to the operating lever for engaging the operating lever and, on the other hand, to the operating member, and guided in the case;

a cog attached to the control rod, wherein the cog forms a mechanical connection between the rod and the operating lever and wherein the cog slides in the elongated opening of the operating lever;



a laterally extending bar carried by the control rod exterior of said tank;

a rocker bar attached to the operating member on one side of said pivotal mount for supplying a mechanical connection between the control rod and the operating member by engaging said bar in a sliding lifting manner to lift said valve.

4,956,881

HEAD SUPPORT APPARATUS

Stephen M. Lindley, 2400 Creekwood, and Brandy L. Stein, 302 Denton St., both of Denton, Tex. 76205

Filed Aug. 7, 1989, Ser. No. 389,984

Int. Cl.[5] A45D *44/10*

U.S. Cl. 4—517 **25 Claims**

1. Apparatus for supporting a person's head comprising:

a support sling adapted to be placed under the back of the person's head wherein each end of the sling extends upward on either side of the person's head;

a rope having two sections, each section of rope being attached to one end of the sling wherein the two sections of rope extend upward from the sling;

holding means for holding the two sections of rope above the person's head; and

means operatively interconnecting the two sections of rope above the person's head so that when the person's head is rotated one section of rope moves upward and the other section of rope moves downward.

4,956,882

BATH TUB LINER

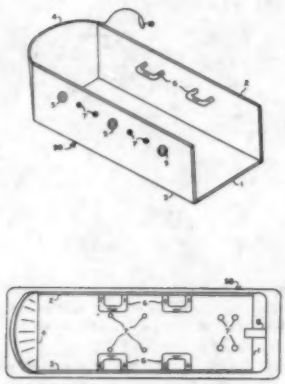
Harold S. Cohn, III, 253 New Jesup Rd., Brunswick, Ga. 31520

Filed Jul. 19, 1989, Ser. No. 382,776

Claims priority, application Japan, Dec. 30, 1988, 63-335549

Int. Cl.[5] A47K *3/02*

U.S. Cl. 4—580 **5 Claims**



1. The combination of a bathtub liner temporarily attachable to the vertical walls of a bathtub and detachable support means attachable to the bathtub liner, where the combination is capable of supporting the weight of a child and assisting an adult in entering or exiting the bathtub, comprising:

a substantially rigid bottom panel;

two substantially rigid lateral panels having suction cups for temporary attachment of the lateral panels to the vertical sides of a bathtub, said lateral panels having sufficient rigidity and thickness to support the weight of a child or an adult entering or exiting the bathtub;

a plurality of support member attachment means, located in said bottom panel and said lateral panels, adapted to detachably retain support members;

said support members adapted to be detachably retained by said support member attachment means;

where said support member attachment means are sockets and said support members have ends which interlock with said sockets;

where the interlock of said support members to said sockets and the attachment of said lateral panels to said bathtub are of sufficient strength to remain intact when subjected to the weight of a child or an adult entering or exiting said bathtub.

4,956,883

SHOWER FIXTURE

Dale Lane, 4411 Marsh Rd., Marietta, Ga. 30066

Filed Oct. 30, 1989, Ser. No. 428,996

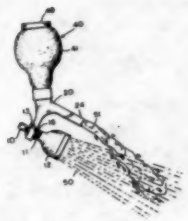
Int. Cl.[5] A47K *3/22*

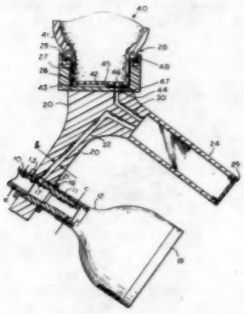
U.S. Cl. 4—605 **10 Claims**

1. Apparatus for dispensing liquid soap into or adjacent to a water stream emitted from a primary shower head mounted to a water line of a selected size, and with the apparatus comprising an auxiliary shower head from which a branch line extends of a size smaller than the water line size; means for mounting said auxiliary shower head adjacent to the primary shower

head with said branch line in fluid communication with the water line, and a liquid soap reservoir mounted in valved fluid communication with said auxiliary shower head.

10. A shower fixture comprising a primary shower head having a set of holes of a selected primary cumulative size, an





auxiliary shower head having a set of holes of a selected cumulative size as large as or greater than said primary cumulative size, means for mounting said primary shower head and said auxiliary shower head to a water line in fluid communication therewith, and a liquid soap reservoir mounted above said auxiliary shower head in fluid communication therewith.

4,956,884

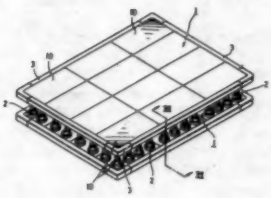
MODULAR BOX SPRING MATTRESS

Dye-Shuh Hwang, 237, Cherng-Ming St., Kaoshung, Taiwan

Filed Nov. 18, 1988, Ser. No. 273,448

Int. Cl.[5] A47C *23/04*

U.S. Cl. 5—246 **7 Claims**



1. A modular box spring mattress comprising two flexible plate units having a spring unit disposed between said plate units for biasing said plate units away from each other, said spring unit including a plurality of coiled compression springs and one of said flexible plate units comprising:

a plurality of plate subunits joined together side by side defining at least one of the flexible plate units, each plate subunit having a substantially rectangular configuration and including a plurality of pins and a plurality of retaining holes formed along two adjacent sides thereof, a plurality of insertion members secured to the remaining adjacent sides thereof, said insertion members including a looped portion generally perpendicular to said subunits for insertion through said retaining holes in a side of an adjacent subunit so as to form a pin hole in an end portion of each of said looped portions, said pins being inserted through said pin holes so as to retain said subunits together;

a plurality of annular flanges extending from each plate unit towards each other, said annular flanges of one of said plate units opposing said annular flanges of the other plate unit so that end turns of said compression springs are receivable within said annular flanges;

a plurality of flexible retaining arms extending obliquely and inwardly from each of said annular flanges in a plane generally parallel to said plate subunits, the angle formed at the tangent of each flexible retaining arm and its respective annular flange being approximately 45°, said flexible retaining arms including end portions spaced apart from its corresponding plate subunits so that said end turns of said compression springs can be respectively retained between said flexible retaining arms and said plate subunits.

4,956,885

PATIENT SUPPORT FOR DIAGNOSTIC APPARATUS

Thomas Alich, Elmshorn; Peter Flisikowski, and Horst Peemoller, both of Hamburg, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 21, 1989, Ser. No. 410,692

Claims priority, application Fed. Rep. of Germany, Oct. 3, 1988, 3833594

Int. Cl.[5] A61G *7/06*

U.S. Cl. 5—431 **6 Claims**

1. A patient support for a diagnostic apparatus, notably for an MRI apparatus, comprising a cantilevered stretcher to support an object to be examined and to be introduced into an examination zone of the apparatus, the support comprising a core of fibre-reinforced epoxy resin provided with a coating, characterized in that the core is made of a fibreglass-reinforced synthetic material on an epoxy resin basis with an isotropic fibreglass structure wherethrough cavities extend in a longitudinal direction of the stretcher, which cavities are filled with a fibreglass fleece impregnated with epoxy resin, an upper side of the stretcher being provided with a fibre-reinforced coating of a synthetic material on an epoxy resin basis with unidirectional fibres of a synthetic material of high tensile strength.

4,956,886

SELF ADJUSTABLE NECK SUPPORT PILLOW

Jeff Sarkozi, 1117 N. Avila Pl., Orange, Calif. 92669

Filed Oct. 2, 1989, Ser. No. 415,873

Int. Cl.[5] A47G *9/00*

U.S. Cl. 5—437 **5 Claims**

1. A three-component, self adjustable pillow comprising:

a. a base portion having a generally elliptically-shaped cross section, and including a cloth exterior and soft fill interior;

b. a generally rectangularly-shaped cloth attachment piece

defining an attachment edge, and a free edge, the attachment edge being connected to the pillow; and,

c. a cylindrically-shaped neck support defining a longitudinal portion connected to the attachment piece along the free edge, the neck support providing a cloth exterior and soft fill interior; whereby:

i. the attachment piece is adapted to freely move over part of the said base portion along with the attached neck support, for adjustable positioning by the user;

ii. the soft fill interior of the said base portion is adapted to transmit forces of compression by the shoulders inwardly along the said base portion and upwardly to the neck support for supporting the neck of the user;

iii. the head and shoulders of the user are supported by the said base portion, the size of the neck support being sufficient to maintain the head, shoulders and neck of the user reasonably aligned, thus reducing aching, discomfort, stiffness and muscle strain of the neck muscles;

wherein the base portion dimensions are about 12"–18" wide, about 30"–36" in length, the cloth attachment piece is about 3"–5" wide, and the neck support is about 1"–4" in diameter, whereby,

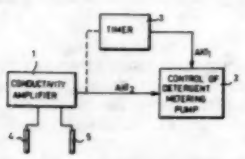
d. i. during sleep, the inward forces of compression on the said base portion due to the user's shoulders will produce a corresponding upward force on the neck support, and self adjustment of the components; ii. the neck support provides a freely movable range along the plane or surface of the said base portion from about midway to about the edge thereof; iii. the attachment piece maintains the neck support portion in contact with the said surface throughout its range of movement, while simultaneously maintaining the user's head and neck on the said base portion; and iv. the said neck support throughout its freely movable range may be purposefully adjusted by the user while awake, or may self adjust when the user is asleep, and maintains the user's head and shoulders on the pillow, while enabling the user to adjust the degree of support on the neck when adjusting body position from side to back.

4,956,887

METHOD OF METERING DETERGENT

Vesa Hakulinen, Kansakoulunkatu 2 A 5, SF-04400 Järvenpää, Finland

Filed Apr. 4, 1989, Ser. No. 333,047
Claims priority, application Finland, Apr. 7, 1988, 881619
Int. Cl.[5] D06F *39/02*
U.S. Cl. 8—158 **8 Claims**



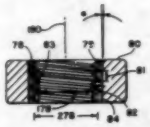
1. A method of metering detergent into a washing solution in large washing apparatuses and systems, comprising measuring, from a washing solution containing water and detergent, a property proportional to the detergent concentration of the washing solution, and adding detergent to the washing solution if the value of the measured property corresponds to a detergent concentration below a predetermined threshold value, the addition of detergent being allowed only during a predetermined metering period for the time when the detergent concentration corresponding to the property measured from the washing solution is below said threshold value during said metering period, and that the addition of detergent is prevented after each metering period for the time of a predetermined mixing period.

4,956,888

FORMATION OF FASTENERS AND CONNECTIONS WITH VARIABLE PITCH THREADS

William P. Green, 3570 E. Lombardy Rd., Pasadena, Calif. 91107

Division of Ser. No. 738,256, May 28, 1985, Pat. No. 4,842,464.
This application Mar. 6, 1989, Ser. No. 318,859
Int. Cl.[5] B21D *53/20*; F16B *39/30*
U.S. Cl. 10—86 A **5 Claims**



1. The method of forming a composite nut that comprises:

progressively deforming an elongated element having a predetermined initial cross section to the form of a coil defining an internal thread and having a progressively changing cross section giving the thread a progressively changing pitch; and

securing said coil rigidly within a passage in a nut body with the thread at said changing pitch;

said deforming of the element including shaping said element to have axial and radial dimensions one of which progressively increases in a predetermined direction, and the other of which progressively decreases in said direction at a rate compensating for the increase in said one dimension and giving the element a substantially uniform cross sectional area along its length.

4,956,889

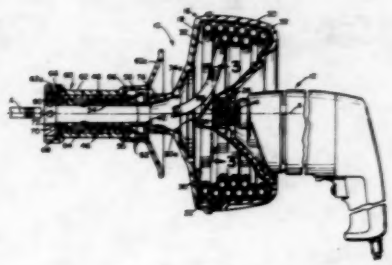
PORTABLE DRAIN CLEANING APPARATUS

Karl L. Kirk, Elyria, Ohio, assignor to Emerson Electric Co., St. Louis, Mo.

Filed Jul. 3, 1989, Ser. No. 374,842
Int. Cl.[5] B08B *9/02*
U.S. Cl. 15—104.33 **36 Claims**

1. In a drain cleaning apparatus comprising tubular guide means having an axis, snake means extending through said guide means, means to rotate said guide means about said axis, spring finger means rotatable with said guide means and including jaw means displaceable toward and away from said snake means between clamping and released positions relative thereto, and sleeve means removably received on said guide means and being axially displaceable relative thereto to actuate said spring finger means to displace said jaw means between said positions thereof, the improvement comprising: said spring finger means, said guide means and said sleeve means including means engaging with one another to alone support said spring finger means against axial and circumferential dis-

placement relative to and radial separation from said guide means, said means engaging with one another including inner surface means on said sleeve means radially capturing said



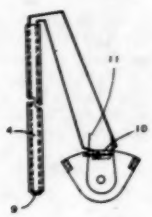
spring finger means between said guide means and sleeve means, whereby said sleeve means when removed from said guide means releases said spring finger means for free radial separation from said guide means.

4,956,890

DOUBLE CHANNEL BLADE FOR A WINDSHIELD WIPER

Maurice A. Journee, Reilly, France, assignor to Paul Journee S.A., Colombes Cedex, France

Filed Mar. 1, 1989, Ser. No. 317,664
Claims priority, application France, Mar. 2, 1988, 88 02640
Int. Cl.[5] B60S *1/04*
U.S. Cl. 15—250.36 **13 Claims**



1. A wiper blade for use with a windshield wiper, said wiper blade comprising:

a body;

a working portion connected to said body;

two channels extending longitudinally through said blade; and

communicating means, at a first end of said blade, connecting said two channels and providing communication therebetween.

4,956,891

FLOOR CLEANER

Richard F. Wulff, Maple Plain, Minn., assignor to Castex Industries, Inc., Holland, Mich.

Filed Feb. 21, 1990, Ser. No. 483,260
Int. Cl.[5] A47L *11/34*
U.S. Cl. 15—320 **18 Claims**

1. A floor cleaning machine comprising:

a support structure including a housing thereon forming a front and a rear for said machine;

wheel means having an axle means beneath said support structure on a transverse axis intermediate said front and said rear for mobility of said machine;

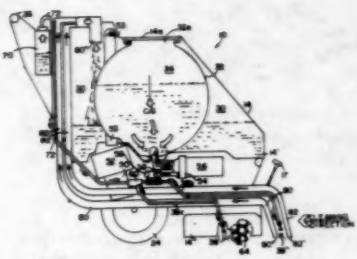
handle means at the upper front of said machine for moving said machine;

floor engaging cleaning means adjacent said rear for cleaning the floor, including a clean water outlet and a dirty water inlet;

said housing having a first water retention chamber with a center of gravity rearward of said axis and substantially forward of said floor engaging cleaning means;

an inner container within said first chamber defining an inner chamber for retention of water separated from water in said first chamber;

said inner chamber being substantially symmetrical with said center of gravity;



clean water conduit means between one of said chambers and said floor engaging cleaning means clean water outlet for conducting clean water to said floor engaging cleaning means;

dirty water conduit means between the other of said chambers and said floor engaging cleaning means dirty water inlet to conduct dirty water from said dirty water inlet to said other chamber;

said first chamber extending in front of and to the rear of said inner chamber, said first chamber and said

inner chamber being located and configured to cause said center of gravity to remain substantially constant during emptying of said one chamber of clean water and filling of said other chamber of dirty water, such that downward force on said floor engaging cleaning means remains substantially constant throughout the cleaning cycle.

4,956,892

CORDLESS VACUUM BRUSH

Donald G. Fawkes, 1000 S. Illinois, #1006, Mason City, Iowa 50401

Filed May 3, 1989, Ser. No. 346,691
Int. Cl.[5] A47L *5/24*
U.S. Cl. 15—339 **23 Claims**

1. A cordless battery operated electric portable vacuum brush, comprising:

a vacuum assembly including a dust trap, a motor operated fan and a brush head for picking up dust particles of the approximate consistency of talcum powder,

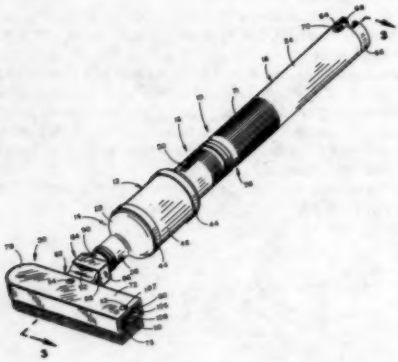
a handle assembly containing one or more rechargeable batteries and a battery charger operably connected thereto,

said handle assembly being detachably secured to said vacuum assembly so that it can be removed therefrom for charging said battery,

switch means for controlling connection of said battery to said motor,

said brush head being of an elongated configuration with a hollow interior, open bottom and peripheral soft, depending bristles, and

means to selectively mount said brush head to said vacuum assembly in a broadside orientation therewith for general



use and in an endwise orientation therewith to facilitate insertion into confined areas.

4,956,893

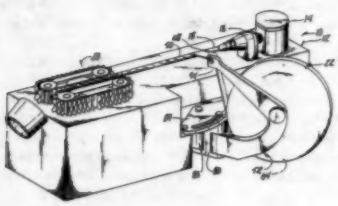
APPARATUS FOR ENCASING A PRODUCT

Ray T. Townsend, Des Moines, Iowa, assignor to Townsend Engineering Company, Des Moines, Iowa

Continuation of Ser. No. 319,261, Mar. 6, 1989, Pat. No. 4,905,349. This application Jan. 12, 1990, Ser. No. 464,303

Int. Cl.[5] A22C *11/10, 11/00*

U.S. Cl. 17—34 1 Claim



1. An apparatus for encasing a plastic product, comprising:

a support;

an elongated casing strip having opposide side edges;

first means on said support for forming said strip into a plurality of helical revolutions with said side edges of said strip within each one of said helical revolutions frictionally engaging and overlapping said side edges of said strip within those of said helical revolutions adjacent said one helical revolution so as to form an elongated tubular casing;

said overlapped edges of said casing strip being sufficiently overlapped to create enough friction cohesiveness to maintain said helical revolutions in a self-contained tubular casing to contain said plastic product;

second means on said suport for introducing said plastic product into said casing; and

a third means to sequentially twist said casing containing said plastic product at spaced intervals to form a linked product with twist points at opposite ends thereof, with the number of twists in said cylindrical casing at said twist points being equal to the number of helical revolutions of said strip in each of said linked products.

4,956,894

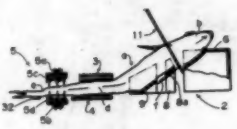
APPARATUS FOR COLLECTING FISH EGGS

Kaneo Matsubayashi, Kishiwada, Japan, assignor to Toyo Suisan Kikai Co. Ltd., Osaka, Japan

Filed Dec. 20, 1989, Ser. No. 454,040

Int. Cl.[5] A22C *25/14*

U.S. Cl. 17—58 4 Claims



1. An apparatus for collecting fish eggs comprising a main endless conveyor for transporting fish with the head of each fish positioned in place and also with the upper half of the fish inclined upward, a pair of upper and lower tail holding endless conveyor belts for holding the tail of each fish therebetween during transport, a pair of upper and lower trunk holding endless conveyor belts disposed between the main endless conveyor and the pair of conveyor belts for holding therebetween the trunk lower half portion of each fish between the abdomen and the tail during transport, trunk support portions and fish back restraining frames arranged alternately on the lower trunk holding endless conveyor belt, a cutter for cutting off the head of each fish during transport, a press member adapted to come into contact with the anal portion of each fish after the head has been cut off, and a press member operating mechanism for moving the press member along a fish back bearing face of each restraining frame approximately in parallel thereto as each fish is transported.

4,956,895

REMOVABLE CLIP FOR PORTABLE EQUIPMENT

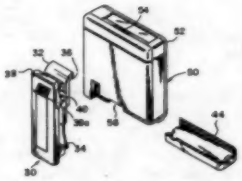
Sigeki Hayasaka, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 138,403, Dec. 28, 1987, abandoned. This application Oct. 4, 1989, Ser. No. 418,749

Claims priority, application Japan, Dec. 25, 1986, 61-201952[U]

Int. Cl.[5] A45F *5/02*

U.S. Cl. 24—3 J 5 Claims



1. A structure for removably mounting a clip to portable equipment, said clip having a molded plastic support member which is shaped complementary to a back of a housing of said equipment and a clip member constantly biased by a spring toward said back of said housing, said structure comprising:

a first, plastic mating portion provided on a top of said housing of said equipment;

a second mating portion provided on said back of said housing;

a third mating portion provided on a top of said support member of said clip for mating with said first mating portion; and

a fourth, metal mating portion buried in a lower end of said

support member for mating with said second mating portion.

4,956,896

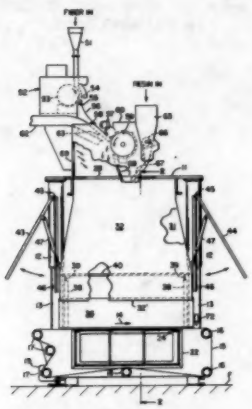
METHOD AND APPARATUS FOR FORMING NONWOVEN FIBER WEBS

Michael L. Wilder, Victor; Michael A. Ruffalo, Newark; George R. Lilly, Palmyra, and William M. Hardy, Victor, all of N.Y., assignors to Phoenix Associates, Victor, N.Y.

Filed May 3, 1989, Ser. No. 347,392

Int. Cl.[5] D01G *25/00*; D04H *1/00*

U.S. Cl. 19—305 **13 Claims**



1. Apparatus for producing nonwoven fiber mats comprising:

a frame,

a screen mounted on said frame to travel in an endless path, and having an upper run mounted to travel in a generally horizontal plane in one direction,

a platform mounted on said frame above and in vertically spaced relation to the upper run of said screen,

means for directing a supply of fibers downwardly through an opening in said platform and onto said upper run of said screen to form a substantially shingle-free nonwoven fiber mat thereon,

said means comprising an adjustable hood mechanism extending between said platform and said upper run of said screen, and operative to guide fibers from said supply thereof onto preselected surface areas of said upper run,

said hood mechanism comprising a pair of adjustable, laterally spaced, fiber-guiding curtain members connected adjacent their upper ends to said platform adjacent opposite sides, respectively, of said opening therein, and extending downwardly therefrom to points adjacent opposite sides, respectively, of said upper run of said screen,

said pair of curtain members being operative to form therebetween a generally tunnel shaped passage extending beneath said platform in the direction of travel of said upper run, and open at opposite ends thereof to the ambient atmosphere,

means adjacent opposite sides of said upper run of said screen for moving the lower ends of said curtain members selectively toward and away from each other, thereby selectively to decrease or increase, respectively, the space between said curtain members and consequently the width of the mat formed on said screen. .

4,956,897

CAM CLEAT

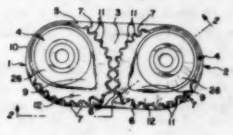
Robert Speedie, Sandringham, Australia, assignor to Ronstan International Pty. Ltd., Sandringham, Australia

Filed Jun. 21, 1989, Ser. No. 369,146

Claims priority, application Australia, Jun. 21, 1988, PI8902

Int. Cl.[5] F16G *11/00*

U.S. Cl. 24—134 P **14 Claims**



1. A cam cleat including at least two gripping members mounted in spaced apart relation, the gripping members provided a line gripping passage therebetween through which a line can extend; at least one of the gripping members including a cam shaped gripping pawl mounted on a base member for pivotal movement, relative to the or at least one other gripping member, movement of the gripping pawl toward the other gripping member closing the line gripping passage until a line therein is gripped between the gripping members; the or each gripping pawl having a pair of gripping surfaces arranged in a symmetrical relation so that one or other of the gripping surfaces engage the line during gripping, the surface allocated for gripping depending on the orientation of the gripping pawl relative to other gripping member.

4,956,898

HOSE CLAMPING DEVICE

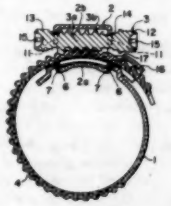
Masashi Miyamura, Kurobe, and Nobuyuki Kawano, Nagaoka, both of Japan, assignors to Toyox Co., Ltd., Japan

Filed Sep. 29, 1989, Ser. No. 414,242

Claims priority, application Japan, Sep. 29, 1988, 63-128214[U]; Nov. 21, 1988, 63-152149[U]; Nov. 21, 1988, 63-152150[U]

Int. Cl.[5] F16L *33/08*

U.S. Cl. 24—274 R **2 Claims**



1. A hose clamping device which comprises:

an elongated clamping band which has a first end portion, a second end portion and a plurality of engagement means therealong,

a housing which is attached to said first end portion of said clamping band and which provides a first end, a second end and a passageway that extends from said first end to said second end, the second end portion of said clamping band extending through said passageway from said first end to said second end of said housing to form said clamping band into a main portion having a generally circular shape and a projecting portion which extends beyond the second end of said housing,

a worm screw which is stationarily mounted in said housing

and which includes a central shaft that has worm threads that engage with said plurality of engagement means of said clamping band and a head end having means for engagement by an operating tool in order to rotate said worm screw and move the second end portion of said clamping band through the passageway in said housing to thereby increase or decrease the diameter of the generally circular shape formed by the main portion of said clamping band and the length of the projecting portion of the clamping band, and

a band guide means which comprises two curved support arms extending away from the second end of said housing and a guide element connected between said two curved support arms, said guide element contacting the projecting portion of said clamping band to cause the projecting portion to extend in general conformity with the generally circular shape formed by the main portion of said clamping band.

4,956,899

SELF CLAMPING DEVICE

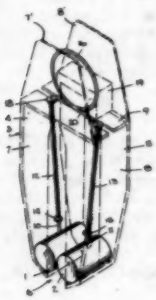
John Green, 7 Avenue de Grande Bretagne, "Le Montaigne" Monte Carlo, Monaco

Filed Apr. 17, 1989, Ser. No. 339,504

Claims priority, application European Pat. Off., Mar. 22, 1989, 89440023.3

Int. Cl.[5] B42F *1/00*

U.S. Cl. 24—488 **14 Claims**



1. A self-clamping device for temporarily securing a relatively flat piece of material without damaging said material, comprising:

a casing having a longitudinal opening lying in a first plane through which opening said relatively flat piece of material can pass, said casing being formed with a relatively flat interior side wall of a given width diverging away from a second plane, said second plane lying perpendicularly to said first plane, and a relatively flat interior opposing wall of about said same given width as said diverging wall, said opposing wall facing said diverging wall;

a first and second parallel roller each of said given width and each rotatably and slidably mounted in said casing, said casing having two flat interior side walls each diverging away from said second plane, said rollers being dimensioned and disposed so as to contact substantially all of said material as is covered by said device;

first and second rods;

first and second compression springs wound about and engaging said first and second rods;

first and second means for attaching said first and second rods to said first and second rollers; and

means for releasing said material;

said rollers, diverging side walls and springs all cooperating so that when said material is inserted into said opening said material passes between said rollers and said rollers roll along said diverging walls away from said opening, compressing said springs, whereby after said material is inserted in said casing said springs force said rollers along said diverging walls toward said opening and said material so that said rollers are urged against said material by the wedging action of said rollers as they contact said diverging walls, and furthermore, if any pulling force is applied in an attempt to pull said material from said casing said rollers are even more securely drawn toward said opening by said force, thereby even more firmly wedging said rollers against said material with a wedging action proportional to said pulling force.

4,956,900

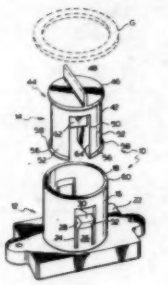
FASTENING DEVICE

Bernard Mair, 1141 Burmac Dr., Unit 9, Weston, Ontario, Canada (M2H 1X4)

Filed Apr. 5, 1989, Ser. No. 333,215

Int. Cl.[5] A44B *11/25*

U.S. Cl. 24—606 **20 Claims**



1. A lockable latch comprising:

an outer cylindrical member and an inner member mounted coaxially within said cylindrical member for relative coaxial movement between first and second positions respectively defining unlocked and locked latch positions;

one of said members including a resilient tongue forming part of the radial wall surface thereof;

the other of said members having an opening in the radial wall surface thereof;

said tongue and said opening being in register when said members are in said first position to permit said tongue to be deformed into said opening, said tongue and said opening being out of register when said members are in said second position whereby said tongue is blocked by contiguous portions of said other member; and

a latching projection formed on distal portions of said tongue facing away from said other member.

4,956,901

APPARATUS AND PROCESS FOR FORMING A WAD OF YARN

Joseph E. Koskol, Wilmington, Del.; Robert J. Santucci, West Chester, Pa., and Louis G. Rosanio, Jr., Wilmington, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 121,059, Nov. 16, 1987, Pat. No. 4,863,029. This application Mar. 6, 1989, Ser. No. 319,311

Int. Cl.[5] D02G *1/12, 1/20*

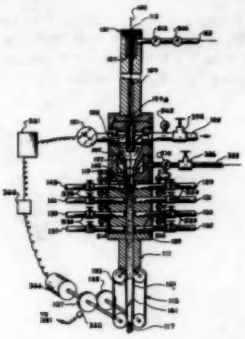
U.S. Cl. 28—255 **5 Claims**

4. A process for compacting yarn into a wad in a wad forming space having an entrance and an exit using pressuried fluid including forwarding said yarn into said wad forming space, comprising:

passing the forwarded yarn through a fluid pressure cham-

ber having an entrance and an exit, the chamber exit in fluid communication with the entrance of said wad forming space;

delivering said yarn into said chamber at a location beyond said chamber entrance;



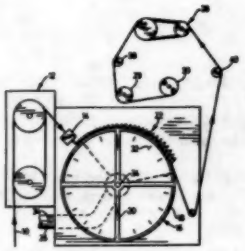
and venting a portion of said pressurized fluid from said chamber at a location before said location of delivery of said yarn into said chamber.

4,956,902

METHOD OF PREDICTING YARN CATERPILLAR LENGTH

Douglas E. Turek, Kingston, Canada, assignor to Du Pont Canada Inc., Mississauga, Canada

Filed Sep. 12, 1989, Ser. No. 406,804
Int. Cl.[5] D02G *1/16*
U.S. Cl. 28—257 **3 Claims**



1. A method of predicting changes in caterpillar length of yarn wherein said yarn is subject to the following processing steps

passing yarn through a set of hot rollers to bulk the fibre;

contacting said yarn with an air jet to pull the yarn away from the hot rollers and impinge it upon a rotating drum comprising an endless textured screen forming a cylindrical outer surface of said drum and a frame to support said screen, thereby forming said yarn into a caterpillar on said screen;

exhausting air from the centre of said drum to draw air through said screen and cool said yarn;

pulling said yarn off of said screen using take-up rollers;

said process comprising:

measuring the change in temperature of the exhaust air (dT1), the change in temperature of the yarn (dT2) as it is taken up from the drum and the change in tension of the yarn (dF) as it is taken up from the drum after a given period of time;

predicting caterpillar length changes (dL) after said given period of time using the correlation:

$$dL = \frac{a(dT1_o)}{(dL_o)}(dT1) + \frac{b(dT2_o)}{(dL_o)}(dT2) + \frac{c(dF_o)}{(dL_o)}(dF) \quad (1)$$

wherein a,b and c are weighted averages, and a+b+c=1; and wherein:

$$\frac{(dT1_o)}{(dL_o)} \quad \frac{(dT2_o)}{(dL_o)} \text{ and } \frac{(dF_o)}{(dL_o)}$$

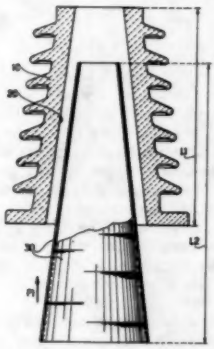
are all empirically determined constants.

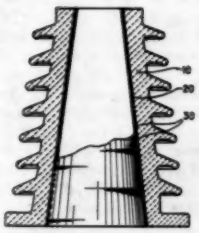
4,956,903

METHOD OF PRODUCING AN INSULATING BUSHING FREE FROM ANY RISK OF EXPLOSION

Edmond Thuries, Pusignan, France, assignor to Societe Anmyne Dite, France

Filed Mar. 15, 1989, Ser. No. 323,917
Claims priority, application France, Mar. 15, 1988, 88 03335
Int. Cl.[5] H01B *19/00*
U.S. Cl. 29—631 **4 Claims**





1. A method of producing a ceramic insulating bushing to be filled with dielectric gas under pressure and which is free from any risk of explosion, said method comprising the following operations:

(1) manufacturing a ceramic bushing having an inside surface which is conical over the entire length of the bushing;

(2) making a conical sleeve of strong insulating material, said sleeve having the same cone angle as the inside surface of

the bushing and having a length which exceeds that of the bushing;

(3) inserting the sleeve into the bushing until it makes contact with the entire inside surface of the bushing; and

(4) cutting off the sleeve at the ends of the bushing.

4,956,904

DEVICE FOR JOINING PIPING MATERIALS

Hidetoshi Yamamoto; Taiji Gotoh, both of Kuwana, and Yoshinori Katoh, Mie, all of Japan, assignors to Mie Horo Co., Ltd., Mie, Japan

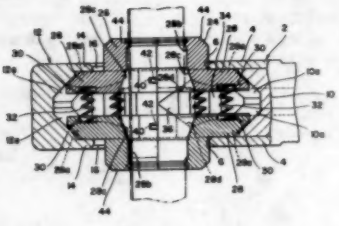
PCT No. PCT/JP88/01226, § 371 Date Aug. 15, 1989, § 102(e) Date Aug. 15, 1989, PCT Pub. No. WO89/06168, PCT Pub. Date Jul. 13, 1989

PCT Filed Dec. 5, 1988, Ser. No. 397,461

Claims priority, application Japan, Dec. 29, 1987, 62-199657

Int. Cl.[5] F16L *35/00*

U.S. Cl. 29—237 **4 Claims**



1. A device for joining piping materials, comprising:

a first processing die (**24**) in which a pair of half-die member (**28**) each having an inclined cam face (**28***a*) formed on an outer side of its back portion are combined through connecting means, said half-die members (**28**) being mutually approachable in a direction parallel to the axis of the piping materials to be joined by use of a means for moving them closer or farther relative to each other;

a second processing die (**26**) having a similar structure to said first processing die (**24**) composed of a pair of half-die members (**28**) designed to be disposed symmetrically relative to the axis of said first processing die (**24**) and the piping materials;

a first and second box-shaped cam housings (**2, 12**) for receiving said two processing dies (**24, 26**), respectively, disposed to oppose each other, such that they can be opened or closed;

wherein said first and second box-shaped cam housings (**2, 12**) each having cam faces (**10***a*, **12***a*) which push the respective inclined cam faces (**28***a*) formed on said pair of half-die members (**28**) so as to move said pair of half-die members (**28**) closer to each other in said direction parallel to the axis of the piping materials to be joined; and

guide plate (**36**) being disposed in at least one of said box-shaped cam housings (**2, 12**) to maintain movement of said half-die members (**28**) closer or farther relative to each other in said direction parallel to the axis of the piping materials to be joined, with opposing faces of the half-die members (**28**) being kept parallel to each other.

4,956,905

TOOL FOR HOLDING A ROTATABLE LAWN MOWER BLADE

Leonard D. Davidson, 301 East St., Farmersville, Ill. 62533

Filed Nov. 30, 1989, Ser. No. 443,749

Int. Cl.[5] B23Q *3/00*

U.S. Cl. 29—281.1 **8 Claims**

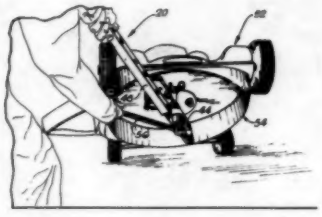
1. A tool for holding a rotatable lawn mower blade having cutter and air vane formations along leading and lagging edges at opposite end portions thereof, the lawn mower blade holding tool comprising:

a U-shaped bracket having a horizontal web and a pair of upstanding, horizontally-spaced flanges parallel to and spaced equidistantly from a central vertical plane;

said flanges having bolt hole means spaced upwardly from said web;

retainer bolt means extending through said bolt hole means;

said web, flanges and retainer bolt means adapted to surround and retain a lawn mower blade and to define a retaining space for an end portion of the blade; and



an elongated handle rigidly fixed to the underside of the web and extending horizontally from said bracket along said central vertical plane and being offset downwardly to a level below the web to clear the bottom edge of the skirt of a lawn mower housing while a lawn mower blade is retained in said space;

whereby the tool is engageable with a lawn mower blade in a lawn mower housing to hold the blade against rotation during removal and replacement.

4,956,906

METHOD OF PREPARING PRE-DISTORTED IMAGES FOR DECORATING A SHAPED BLANK

Christophe Masse, La Tronche, and Michel Philippe, Villaines sous Malicorne, both of France, assignors to Cebal, Clichy, France

Filed Dec. 5, 1988, Ser. No. 279,579

Claims priority, application France, Dec. 1, 1988, 88 16099

Int. Cl.[5] B21K *21/16*

U.S. Cl. 413—8 **13 Claims**

1. A method for decorating the surface of a blank to be shaped into a product, comprising the steps of:

(a) locating on a test blank a plurality of reference points distributed over the entire surface of the test blank which will be affected by shaping;

(b) shaping the test blank into a test product and determining new positions of the reference points, each said new position corresponding to a reference point on the test blank;

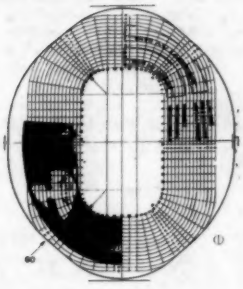
(c) forming a block of a decoration to be obtained on the product, and locating on the decoration the new positions of the reference points on the test product;

(d) converting said decoration into a plurality of pixels of each inking color, and determining the position on each pixel with respect to the new position of a reference point;

(e) relocating each said pixel with respect to each other individually, from a new position to the corresponding reference point on the test blank;

(f) locating on a film a plurality of reference points corresponding to the reference points on said test blank, and

printing said film with each pixel of the decoration reproduced in a location corresponding to the reference point



on the test blank to which the pixel was relocated, thereby forming a film blank; and

(g) decorating at least one blank with said film blank.

4,956,907

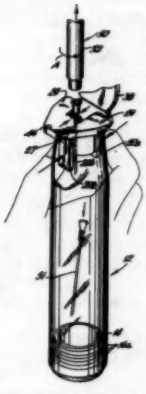
METHOD FOR SAFELY REMOVING, STORING AND ULTIMATELY DISPOSING OF NEEDLES FROM HYPODERMIC NEEDLE/SYRINGE ASSEMBLIES

John Bruno, 77-83 Second Ave., Paterson, N.J. 07514

Division of Ser. No. 12,949, Feb. 10, 1987, Pat. No. 4,801,013. This application Dec. 19, 1988, Ser. No. 286,315

Int. Cl.[5] B23P *19/00*; **B65D** *25/00, 51/00*

U.S. Cl. 29—426.5 **2 Claims**



1. A method for removing the needle portion from a hypodermic needle/syringe assembly and safely storing the removed needle, comprising the steps of:

opening a top closure member formed as part of the top assembly of a needle removal/storage device to expose a needle-receiving opening formed by grasping means which make up part of said top assembly by exerting a downward force on an oppositely projecting flange on said closure member by a finger of the same hand holding the device and simultaneously squeezing said top assembly to release releasable locking means formed between the top closure member and the rest of said top assembly;

inserting the needle into said needle-receiving opening of said needle removal/storage device until its ribbed hub portion is adjacent said grasping means;

exerting a squeezing force on said top assembly to cause constriction of said opening by forcing said grasping means towards each other to grasp the needle hub;

rotating the needle/syringe assembly to separate the syringe from the needle; and

releasing the squeezing force on the top assembly after the separation is complete to allow the needle to drop into said needle removal/storage device.

4,956,908

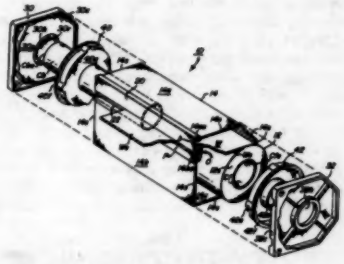
METHOD FOR MAKING A LIGHT-TIGHT CASSETTE

Mark J. Morse, and Andrew E. Dominesey, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 26, 1989, Ser. No. 359,073

Int. Cl.[5] B23P *11/00*

U.S. Cl. 29—438 **18 Claims**



1. A method of making a light-tight cassette for enclosing and dispensing a roll of web material, said method comprising the steps of:

providing a fiberboard sheet of predctermined dimensions;

folding siad sheet to form a housing having a plurality of housing wall portions with oppositely projecting lateral edges defining first and second open sides of said housing, said plurality including first and second substantially planar wall portions that extend substantially perpendicularly to each other to respective first and second ends thereof which are disposed in spaced alignment to define an opening therebetween;

providing first and second extruded plastic light-locking members having means for respective attachment thereof to said first and second ends of said first and second wall portions, wherein said providing said light-locking members includes extruding each of said members so that its means for attachment comprises a resiliently flexible U-shaped portion with open and closed ends defining a channel configured to slidably receive and resiliently grip one of said wall portion ends, and wherein said providing said members further includes extruding said first member so that it has a substantially planar intermediate portion extending substantially perpendicularly from its U-shaped portion closed end to a cantilever portion thereof, and so that said cantilever portion is flexibly joined to said intermediate portion to project therefrom in a resiliently flexible manner;

attaching said first and second light-locking members to said

first and second wall portion ends, respectively, so that said first member intermediate portion extends across said opening toward said second member to define web exit passageway therebetween, and so that said first member cantilever portion projects inwardly from said intermediate portion and is resiliently biased toward an opposing portion of said second member, at least one of said cantilever and opposing portions having light-locking material thereon for light-locking said passageway;

providing said roll of web material wound upon a hollow roll forming core having first and second opposite ends substantially flush with respective lateral edges of said web material wound thereon, said roll forming core ends defining an overall roll width therebetween;

providing a roll bearing core configured to fit slidably within said hollow roll forming core, said roll bearing core having first and second oppositely projecting end portions that define a bearing core length greater than said overall roll width;

providing first and second molded plastic side caps having means for respective attachment thereof to said first and second open housing sides and means for receiving, respectively, said first and second end portions of said roll bearing core;

attaching said first side cap to said first open housing side so that said first housing side is thereby closed;

inserting said roll bearing core through said second open housing side and fully into said housing so that said first bearing core end portion is received by said receiving means on said first side cap;

inserting said roll of web material through said second open housing side, around said roll bearing core, and slidably along said bearing core into said housing so that both of said bearing core end portions extend beyond side roll forming core ends, respectively, and so that an end portion of said web material leading from said roll projects outwardly through said passageway; and

attaching said second side cap to said second open housing side so that said second bearing core end portion is received by said receiving means on said second side cap, and so that said second housing side is thereby closed.

4,956,909

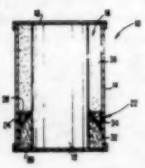
METHOD OF MAKING SPACED-WALL APPLIANCE WITH A SEALING AND INSULATING DEVICE BETWEEN SAID WALLS

Thomas E. Nelson, Anchorage, Ky., assignor to Soltech, Inc., Shelbyville, Ky.

Continuation of Ser. No. 216,384, Jul. 7, 1988, Pat. No. 4,875,272. This application Jun. 30, 1989, Ser. No. 376,138

Int. Cl.[5] B23P *11/02, 19/04;* **B21D** *39/00*

U.S. Cl. 29—451 **13 Claims**



1. A method of assembling an appliance having a first wall surface spaced from a second wall surface defining a space therebetween comprising the steps of:

providing a wedge-shaped insulation and sealing device having a first end and a second opposite end and including a pair of walls converging together at said first end and spaced apart at said opposite end, the direction of taper being from said opposite end to said first end, said pair of walls being fabricated of a flexible material, the width of spacing of said walls at said opposite end being at least approximately equal to the space between the first and second walls of the appliance, and a resilient insulating material disposed within the trough formed by the converging walls of said insulation and sealing device;

positioning the insulation and sealing device in contact with the first wall of said appliance; and

moving the first wall of said appliance in the direction of taper to a position overlaying the second wall in spaced apart juxtaposition with the second wall such that the insulation and sealing device is in contact with the second wall creating a seal across the space.

4,956,910

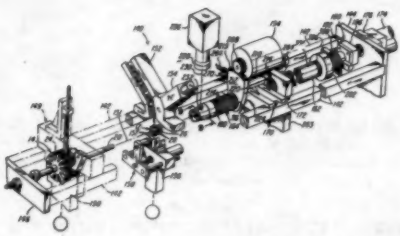
ARMATURE ASSEMBLY METHOD

Alvin C. Banner, Montgomery County; Gary E. Clemenz, Greene County, Frank D. Varecka, Monroe County; and Ballard E. Walton, Montgomery County, all of Ohio, assignors to Globe Products Inc., Dayton, Ohio and General Motors Corporation, Detroit, Mich.

Division of Ser. No. 203,378, Jun. 3, 1988, abandoned. This application Apr. 28, 1989, Ser. No. 345,219

Int. Cl.[5] H02K *15/00*

U.S. Cl. 29—593 **19 Claims**



1. A method for aligning a commutator relative to an armature core mounted on an armature shaft in preparation for placing the commutator onto the armature shaft utilizing a commutator placing ram having a commutator-receiving fixture at one end thereof that non-rotatably receives a commutator and positions said commutator with its center axis aligned with the axis of movement of said ram, said method comprising the steps of:

supporting an assembled armature core and armature shaft in axial alignment with said fixture;

positioning a tang-oriented commutator within said fixture;

detecting the angular distance of an edge of a commutator bar of said commutator relative to a predetermined reference position; and

bar edge-orienting said commutator relative to said core by rotating said fixture relative to said core through an angle equal to said detected angular distance.

4,956,911

TOOL FOR REPAIRING SURFACE MOUNTED COMPONENTS ON PRINTED CIRCUIT BOARD

Norman S. Zaremba, St. Charles, and John P. Beyer, Western Springs, both of Ill., assignors to AG Communication Systems Corporation, Phoenix, Ariz.

Filed May 18, 1990, Ser. No. 524,893

Int. Cl.[5] H05K *3/30*

U.S. Cl. 29—721 **14 Claims**

1. A tool for use in repairing an improperly positioned surface mounted component on a printed circuit board, comprising:

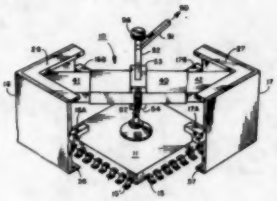
a horizontal body;

a plurality of vertical members depending at right angles from said body;

said members angularly positioned on said circuit board adjacent said component;

locating means positioned on each of said members;

a vertically movable vacuum plunger mounted on said body operated in a downward direction to engage said component followed by vertical motion of said plunger to move



said engaged component upward into contact with said locating means;

whereby said component is relocated relative to said printed circuit board;

said plunger further operated to release said component thereby positioning said component in proper position on said printed circuit board.

4,956,912

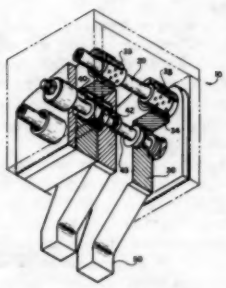
UNIVERSAL TOOL HOLDER

Robert Preg, 2809 Filbert Ave., Reading, Pa. 19604

Filed Mar. 15, 1989, Ser. No. 324,245

Int. Cl.[5] B23P *19/00*

U.S. Cl. 29—730 **21 Claims**



1. A tool holder useful in the assembly of an electronic storage battery case work piece having at least one cell partition comprising:

(a) a housing;

(b) movable first and second jaw holders for holding jaws which are disposed on sliding means in the housing which houses a multiplicity of guide rods whose longitudinal axes define point centers equidistantly disposed about a defined geometric point center from each other;

(c) the first jaw holder having constructed interiorly a cylindrical piston chamber in which is disposed a fluid driven reciprocating piston with a shaft whose longitudinal axis is parallel to the guide rod axes and has lying on its linear extension the geometric center point;

(d) the shaft being connected to the second jaw holder such that the first and second jaw holders will move toward each other to close and away from each other to open slidingly on the guide rods by bearing means;

(e) and when closed the jaw holders will center up slidingly over the workpiece partition.

4,956,913

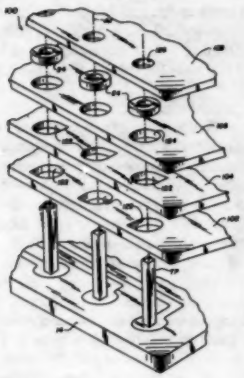
PIN ALIGNMENT METHOD

Michael P. Eck, Wellsville, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 192,689, May 11, 1988. This application Oct. 10, 1989, Ser. No. 418,833

Int. Cl.[5] H01R *43/00*

U.S. Cl. 29—884 **1 Claim**



1. A method for aligning terminal pins in a pin field and for installing a solder preform onto the aligned pins, the method comprising the steps of:

mating the tips of a plurality of pins in a field in jaw plate assembly having a plurality of openings, the size of each of said openings being variable, controlling the size of the openings from a first size to a second size thereby constraining the pins to a selected predetermined alignment;

placing a solder preform over each so-aligned pin;

advancing the jaw plate assembly and solder preform in the direction of a proximate, base end of the pin; and

withdrawing the jaw plate assembly to thus install the solder preform onto the pin.

4,956,914

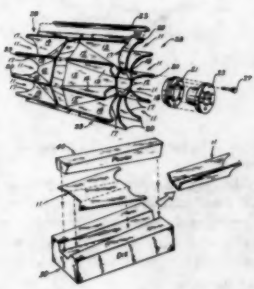
METHOD OF MAKING WING PULLEYS

Karl C. Valster, and Allen V. Reicks, both of Pella, Iowa, assignors to Precision Pulley, Inc., Pella, Iowa

Filed Dec. 21, 1989, Ser. No. 454,428

Int. Cl.[5] B21K *1/42*

U.S. Cl. 29—892.1 **8 Claims**



1. A method of making a wing pulley using a plurality of

substantially identical building block segments, said building block segments comprising:

a first panel disposed at least generally in a first plane, said first panel having a first edge, a second edge, an outer end and an inner end, said first panel being wider at the inner end than at the outer end thereof;

a second panel disposed at least generally in a second plane, said second panel having a first edge connected to said first edge of said first panel and a second edge, an outer end and an inner end; and

a third panel disposed at least generally in a third plane, said third panel having a first edge connected to the second edge of said first panel, a second edge, an outer end and an inner end;

said method comprising:

connecting together a predetermined number of said building block segments to form a first rigid annular subassembly by connecting the second panel of each building block segment to the third panel of each adjacent building block segment whereby said first annular subassembly extends a full 360 degrees, said first rigid annular subassembly having an outer end and an inner end;

connecting together a second rigid annular subassembly from said predetermined number of said building block segments by rigidly connecting the second panel of each building block segment of said second annular subassembly to the third panel of each adjacent building block segment of said second rigid annular subassembly whereby said second annular subassembly is substantially identical to said first annular subassembly, said second rigid annular subassembly having an outer end and an inner end;

rigidly connecting said inner ends of said first and second rigid annular subassemblies together in a relationship whereby the second and third panels of said first rigid annular subassembly are generally in the same plane as corresponding third and second panels respectively of said second rigid annular subassembly;

rigidly attaching a hub to the outer end of said first rigid annular subassembly; and

rigidly attaching a hub to the outer end of said second rigid annular subassembly.

4,956,915

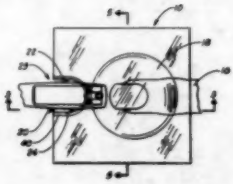
SANITARY NAIL CLIPPING DEVICE

Charles A. Anderson, 1400 George, Norman, Okla. 73072

Filed Jun. 2, 1989, Ser. No. 360,769

Int. Cl.[5] A45D *29/00, 29/18*

U.S. Cl. 30—28 **8 Claims**



1. A sanitary nail clipping device for clipping fingernails and toenails comprising:

an enclosure having an opening thereinto to facilitate the insertion of a nail-carrying digit into the enclosure;

an aperture in the enclosure opposite said opening; and

a nail clipper having a jaw-carrying end portion extending through said aperture, with said jaws located within said enclosure; and

means detachably engaging said nail clipper with said enclosure so that when desired, said clipper can be withdrawn from said enclosure through said aperture.

4,956,916

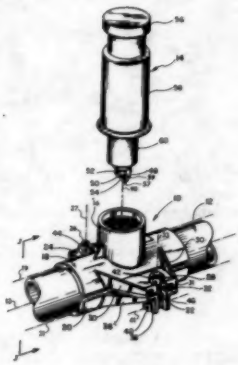
CUTTING TOOL

Duane D. Robertson, 2601 Utica St., Denver, Colo. 80212

Division of Ser. No. 12,291, Feb. 9, 1987, Pat. No. 4,789,189, which is a continuation-in-part of Ser. No. 834,960, Feb. 28, 1986, abandoned. This application Aug. 22, 1988, Ser. No. 234,680

Int. Cl.[5] B23D *21/06*

U.S. Cl. 30—92 **4 Claims**



1. A cutting tool primarily intended for forming a hole in a plastic pipe in alignment with a pipe saddle opening of a pipe saddle, said cutting tool including:

handle means extending along a central axis,

prong means extending along an axis and mounted to said handle means with the axis of said prong means substantially parallel to and colinear with said central axis of said handle means, said prong means having a pointed end for penetrating said pipe, said pointed end facing in the direction of the axis of said prong means,

cutting means including at least one blade member extending along an axis and mounted to said handle means with the axis of said blade member spaced from and substantially parallel to the central axis of said housing means and to the axis of said prong means, said blade member extending about said central axis for a radial angle substantially lss than 180° and said blade member having a knife edge extending along the axis of said blade member and facing in a direction substantially perpendicular to the axis of the blade member wherein said handle means can be manipulated to have the pointed end of the prong means and the blade member penetrate the pipe whereby the handle means can then be rotated about said central axis to radially advance said knife edge through said pipe about said central axis and the axis of said

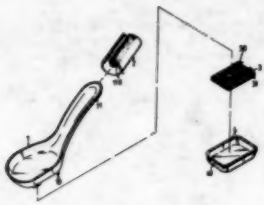
housing means disposed about said handle means and means for mounting said handle means and prong means and cutting means for movement as a unit relative to said housing means along said central axis, said handle means, prong means, and cutting means being moveable relative to said housing means from a first position exposing said pointed end of said prong means and said knife edge of said blade member beyond said housing means and a second position in which said prong means and cutting means are retracted into said housing means, said housing means including means for abutting and removing said impaled plug from said prong means as said prong means is moved from said first position to said second position.

4,956,917

STRUCTURE OF SPOON

Chin-Fu Chung, No. 18, Hsin Hsing Rd., Tainan, Taiwan

Filed Jan. 18, 1990, Ser. No. 466,817
Int. Cl.[5] A47J *43/28, 47/00*
U.S. Cl. 30—326 1 Claim



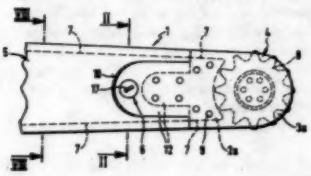
1. A spoon, including
a small, shallow, oval-shaped body having an unitary handle obliquely extending upward therefrom, and comprising a retainer member on its bottom;
a bottom cap secured to said retainer member of said body and comprising a notch on its one side;
a sheet of plastic bags being received in said bottom cap, and comprised of a plurality of plastic bags each being respectively defined by a sealing line and an indentation line; and
a retainer ring having an inner projection;
characterized in that a plastic bag can be drawn out of said bottom cap and separated from said sheet of plastic bags through respective indentation line, for wrapping up the spoon; said retainer ring can be sleeved on said handle to secure a plastic bag thereto; each plastic bag which is separated from said sheet of plastic bag to wrap up the spoon therein can be removed from the spoon each time after use, permitting a new plastic bag from said sheet of plastic bag to wrap up the spoon so that the spoon can be repeatedly used without the need to wash.

4,956,918

GUIDE BAR FOR THE SAW CHAIN OF A MOTOR-DRIVEN CHAIN SAW

Hans-Joachim Beyer, Winnenden, Fed. Rep. of Germany, assignor to Andreas Stihl, Waiblingen, Fed. Rep. of Germany

Filed Sep. 13, 1989, Ser. No. 406,520
Claims priority, application Fed. Rep. of Germany, Sep. 13, 1988, 3831110
Int. Cl.[5] B27B *17/04*
U.S. Cl. 30—387 15 Claims



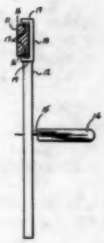
15. A guide bar for the saw chain of a motor-driven chain saw, the guide bar comprising:
a base body section;
a nose assembly section for changing the direction of the saw chain;
a releasable locking device for connecting said nose assembly section to said base body section with said locking device being releasable without destroying the same; and,
said locking device including non-deforming cam means permanently mounted in said guide bar for movement between a release position and a cammed position wherein said sections are held in force-tight engagement with each other.

4,956,919

DRYWALL T-SQUARE

James P. Granger, 7621B Broughton St., Sarasota, Fla. 34243

Filed Sep. 11, 1989, Ser. No. 406,033
Int. Cl.[5] B43L *13/00*
U.S. Cl. 33—32.2 8 Claims



1. A T-square for marking and scoring drywall comprising,
a first rule positioning member and a second rule member slidably mounted
orthogonally relative to the first rule member, and
track means formed in the first rule member for slidably receiving said second rule member, and
a cutting tool, and
a plurality of slot means formed in the second rule member for aligning and guiding the tool and the second rule member relative to the first rule member, and
wherein the first rule member includes a plurality of side walls, and the track means includes a single elongate groove formed continuously within each side wall, and the grooves aligned and parallel relative to one another within the side walls of the first rule member, and the second rule member including a head portion slidably engaging and overlying the first rule member, the head portion including a plurality of downwardly directed flanges parallel relative to one another and orthogonally oriented relative to a top surface of the head member, and a "V" shaped guide projection formed coextensively on confronting surfaces of the flanges, the projections slidably received within the grooves, and
wherein the slot means includes a series of slots parallel to one another oriented orthogonally relative to side edges of the second rule member, and the tool including a pointed blade directed exteriorly therefrom selectively receivable within each slot.

4,956,920

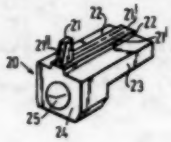
DEVICE FOR DETERMINING TRUE BEARING DURING DAYTIME

Giora Kutz, Tel Aviv, Israel, assignor to Azimuth Ltd., Israel

Filed May 5, 1988, Ser. No. 190,729
Int. Cl.[5] G01C *17/34*
U.S. Cl. 33—268 7 Claims

1. An instrument for determining true bearing during daytime using the sun as a reference, comprising:
a reference member including a rectangular horizontal surface;
a vertical post for producing a shadow, the post having a rectangular horizontal cross section and attached to the reference member to project vertically from the rectangular horizontal surface such that the sun casts a shadow of the post upon the rectangular horizontal surface;

the post being positioned to cast said shadow on a predetermined location of the rectangular horizontal surface when the post is exactly aligned with the sun; at exact alignment,



the shadow falling centrally upon the rectangular horizontal surface and being straddled by equally-dimensioned unshadowed side margins.

4,956,921

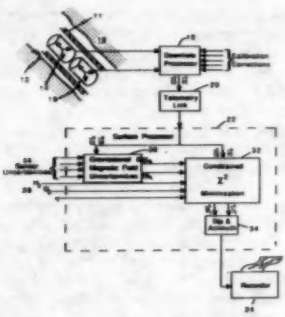
METHOD TO IMPROVE DIRECTIONAL SURVEY ACCURACY

Mark Coles, Richmond, Tex., assignor to Anadrill, Inc., Sugar Land, Tex.

Filed Feb. 21, 1989, Ser. No. 313,765

Int. Cl.[5] E21B *47/22*

U.S. Cl. 33—304 **18 Claims**



2. A method for surveying a borehole formed through subsurface geological earth formations comprising the steps of:

a. at an in situ location in said borehole, measuring, with magnetic and gravitational field responsive measuring instruments, a plurality of components of the gravitational field strength and a plurality of components of the magnetic field strength;

b. determining measurement uncertainties for each of said gravitational and magnetic field components; and

c. in response to said measured components and to said measurement uncertainties, determining the azimuth and the inclination of the borehole at said in situ location in the borehole.

4,956,922

BUBBLE INCLINATION GAUGE INCLUDING A CENTRAL SHIELD FOR LIGHT-EMITTING AND LIGHT-DETECTING MEANS

Johannes W. M. Bodewes, Beverwijk, Netherlands, assignor to Sopha Bodewes-Tunhau, Beverwijk, Netherlands

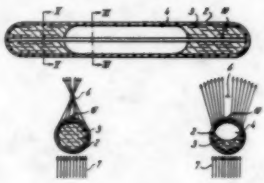
Filed Jul. 3, 1989, Ser. No. 383,740

Claims priority, application Netherlands, Jul. 1, 1988, 8801678

Int. Cl.[5] G01C *9/06, 9/34*

U.S. Cl. 33—366 **7 Claims**

1. Inclination gauge comprising a reservoir, containing a clear liquid and a gas bubble, light emitting and light detecting means arranged at opposed positions with regard to said reservoir, the refractory index of the liquid, of the gas and of the tube material being chosen such that light going through the reservoir completely filled with liquid follows a trajectory substantially differing from the trajectory followed by light traversing the reservoir at least partially filled with gas,



wherein on the center line in the path from the light emitting means and detecting means near the point of egress of light from the reservoir a shield is provided, arranged such that rectilinear transmittal of light from the light emitting means to the light detecting means through the gas bubble is substantially completely blocked.

4,956,923

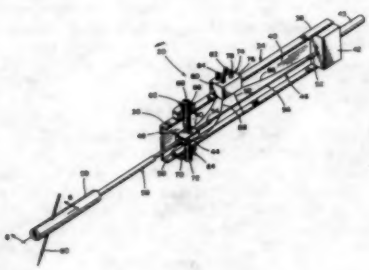
PROBE ASSEMBLY INCLUDING TOUCHDOWN SENSOR

James T. Pettingell, Escondido, Calif., and Kenneth F. Hollman, Carson City, Nev., assignors to The Micromanipulator Co., Inc., Carson City, Nev.

Filed Nov. 6, 1989, Ser. No. 433,021

Int. Cl.[5] G01R *1/06, 31/02*; G01B *7/00*

U.S. Cl. 33—558 **10 Claims**



1. A probe assembly for use at a test station for contacting a predetermined target on an electrical circuitry component and providing a switched output to signal that contact with the target has been made, said probe assembly comprising:

an elongated tubular housing having a first end and a second end and defining a cavity extending between said ends;

a base of insulative material rigidly supported in said housing adjacent said second end;

a contact block located in said housing adjacent said first end;

an interior beam assembly interconnecting said block and said base so that said block is supported by said base, said interior beam assembly including a relatively flexible cantilever beam;

a relatively rigid second beam assembly extending from said contact block beyond said housing first end;

a probe point held by said second beam assembly for contacting said target;

an upper contact held by said housing and extending into said cavity toward said contact block and in alignment therewith; and

a lower contact held by said housing and extending into said

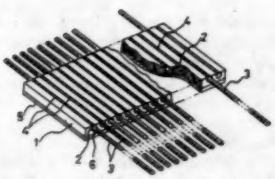
cavity toward said contact block and in alignment therewith, the spacing between said upper and lower contacts being greater than the height of said contact block and the surfaces of said contact block facing said contacts being conductive, said contact block engaging said lower contact when said probe point does not engage said target, said contact block moving out of engagement with said lower contact after said probe point engages said target, and said contact block moving into engagement with said upper contact upon the force applied by said point against said target reaching a predetermined magnitude.

4,956,924

GAUGE DEVELOPER

Ming C. Hu, No. 1, Lane 109, Ta Kuang Road, Sec. 2, Pan Chiao City, Taipei Hsien, Taiwan

Filed Feb. 6, 1989, Ser. No. 306,748
Int. Cl.[5] G01B *5/20*
U.S. Cl. 33—561.1 **10 Claims**



1. A gauge developer, comprising:

a flexible strip having a substantially planar front surface and a plurality of pin holding spaces extending through said flexible strip from one side thereof to an opposite side thereof parallel to said planar front surface;

a plurality of pins made of relatively long and thin steel wire for movable and removable insertion in respective said pin holding spaces; and

magnetic means for magnetically attracting said plurality of pins toward respective surfaces of said plurality of pin holding spaces in said flexible strip for securing said pins therein by frictional resistance;

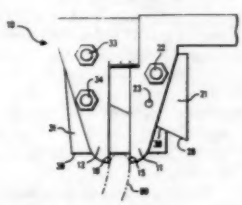
wherein each said pin holding space is tubular and has an elongated opening which opens onto said substantially planar front surface of said flexible strip.

4,956,925

EDGE THICKNESS CALIPER

William S. East, Mt. Airy, N.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 5, 1989, Ser. No. 402,573
Int. Cl.[5] G01B *5/02*
U.S. Cl. 33—810 **12 Claims**



1. A caliper for measuring the thickness of a blade edge comprising:

a pair of opposed jaws disposed for displacement relative to each other in a first plane, each jaw having a free end,

a sliding member mounted to one of said jaws for displacement relative to said free ends of said jaws in a second plane, the second plane being substantially perpendicular to the first plane, said sliding member defining a stop edge between said jaws, and

guiding means operatively associated with said sliding member for causing the magnitude of the displacement of said sliding member in the second plane to be a fixed proportion of the magnitude of relative displacement of said jaws in the first plane and for causing displacement of said sliding member to increase or decrease the distance between said stop edge of said sliding member and said free ends of said jaws as said relative displacement of said jaws increases or decreases the distance between said jaws, respectively,

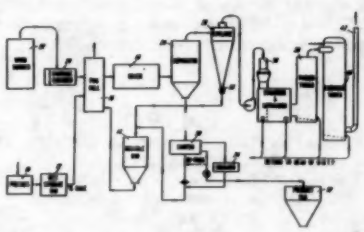
wherein the distance between the jaws is used to measure the thickness of the blade edge.

4,956,926

SLUDGE TREATMENT PROCESS

John D. Glorioso, Clearwater, Fla., assignor to Enviro-Gro Technologies, Baltimore, Md.

Division of Ser. No. 232,640, Aug. 8, 1988, Pat. No. 4,829,678.
This application May 18, 1989, Ser. No. 353,711
The portion of the term of this patent subsequent to Aug. 9, 2005, has been disclaimed.
Int. Cl.[5] F26B *3/24*
U.S. Cl. 34—111 **9 Claims**



1. A process for drying mechanically dewatered sewage sludge to produce pellets of a predetermined small and uniform size comprising the steps of:

providing a first and a second pug mill, each having an inlet and an outlet, said second pug mill being disposed below said first pug mill and at about a 90° angle thereto;

mixing said sludge with recycled, previously dried sludge particles and pellets in said first pug mill; dropping said mixture into said second pug mill; mixing said material further in said second pug mill;

providing a rotary dryer having a inlet and an outlet, the inlet being disposed adjacent the outlet from said second pug mill; dropping said mixture from said second pug mill into the inlet of said rotary dryer and drying said mixture to form pellets and particles thereof;

conveying the dried pellets and particles and drier off gas to a low velocity gas/solids separator and separating and collecting the pellets and a substantial portion of the particles;

clarifying the collected pellets and particles and separating and collecting pellets of a predetermined size, the undersize pellets and particles and oversize pellets constituting recycle material;

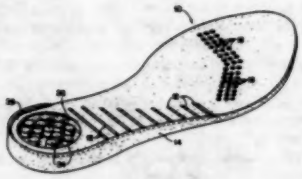
mechanically crushing the recycle materials and collecting the crushed pellets and undersize particles and pellets; and recycling the collected undersize pellets and particles by mixing said recycle materials with said incoming sludge in said first pug mill.

4,956,927

MONOLITHIC OUTSOLE

Kenneth W. Misevich, Griswold, Conn., and Thomas E. Mintel, Rahway, N.J., assignors to Colgate-Palmolive Company, Piscataway, N.J.

Filed Dec. 20, 1988, Ser. No. 286,803
Int. Cl.[5] A43B *13/18, 13/04, 3/14*
U.S. Cl. 36—32 R **33 Claims**



1. An improved monolithic outsole formed as a homogeneous structure for mating with a shoe upper to provide a shoe construction, comprising:

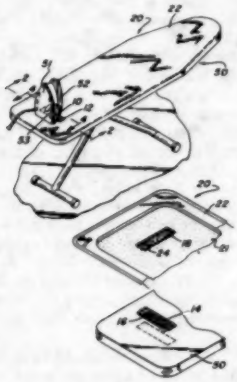
an elongated planar member having the general outline of a foot with a heel region, a ball region and a midfoot region between said heel and ball regions, and with lateral and medial sides or borders and formed with a monolithic structure, said planar member having a plurality of parallel transverse slots located in the upper surface of said planar member in the midfoot region adjacent the lateral border and with said transverse slots being located outside the region of said outsole which is directly under the arch of the foot, said slots being generally perpendicular to the longitudinal axis of said planar member.

4,956,928

APPARATUS FOR SECURING AN IRON TO AN IRONING BOARD COVER

David Lehrman, 207 Barclay Cir., Cheltenham, Pa. 19012

Filed Jan. 11, 1989, Ser. No. 295,867
Int. Cl.[5] D06F *79/00*
U.S. Cl. 38—107 **23 Claims**



1. An apparatus for securing an iron to an ironing board, comprising:

an ironing board cover; and

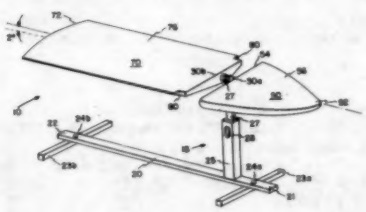
a strap attached to the top surface of said ironing board cover, for releasably engaging the handle of an iron, which strap is adjustable in length.

4,956,929

ADJUSTABLE MULTI-PIECE IRONING BOARD

Supon Chirabandalsuk, 6300 Ranchester #226A, Houston, Tex. 77036

Filed Apr. 14, 1989, Ser. No. 337,934
Int. Cl.[5] D06F *71/02*
U.S. Cl. 38—136 **27 Claims**



1. A rotatably adjustable ironing board comprising:

a supporting frame structure including a base structure, a substantially horizontally disposed supporting member, and a generally vertically disposed, adjustable central support joined at its proximal end to said base member and joined at its distal end to said substantially horizontally disposed supporting member;

a first ironing table supported by a first portion of said substantially horizontally disposed supporting member, said first portion of said substantially horizontally disposed supporting member being positioned generally along a longitudinal axis of said first ironing table, said first ironing table, including first means for rotation of said first ironing table about said first portion of said substantially horizontally disposed supporting member;

a second ironing table supported by a second portion of said substantially horizontally disposed supporting member, said second portion of said substantially horizontally disposed supporting member being positioned generally along a longitudinal axis of said second ironing table, said second ironing table, including second means for rotation of said second ironing table about said second portion of said substantially horizontally disposed supporting member;

a first locking mechanism operatively connected both to said first table and to said first portion for locking said first table against rotation about said first portion; and

a second locking means operatively connected both to said second table and to said second portion for locking said second table against rotation about said second portion.

4,956,930

VEHICLE LICENSE PLATE COVER

Vincent F. Troncoso, 14090- 6100 Rd., Montrose, Colo. 81401

Filed Apr. 12, 1989, Ser. No. 336,684
Int. Cl.[5] G09F *7/00*
U.S. Cl. 40—209 **12 Claims**

1. An improved vehicle license plate assembly, said assembly comprising, in combination:

(a) a vehicle license plate bearing identification indicia on the front face thereof;

(b) a generally flat frame comprising interconnected top, bottom and sides collectively defining a central opening, said frame overlying the outer perimeter of said vehicle license plate, with said opening exposing the identification indicia of said license plate to viewing; and,

(c) a plurality of spaced vanes connected to said frame and spanning said opening, said vanes projecting outwardly at

an angle to said frame so as to obscure viewing of said identification indicia from the sides of said plate.

4,956,931

IDENTIFICATION DEVICE

George V. Selke, Denver, Colo., assignor to Clink Products, Inc., Denver, Colo.

Filed Feb. 27, 1987, Ser. No. 19,640
Int. Cl.[5] A61B *5/00*
U.S. Cl. 40—633 12 Claims

3. An identification and personal information conveying device to be worn by a person comprising:

an elongate, flat, unitary, plastic member having a first end portion, a second end portion, and an intermediate portion and having a generally planar top surface and a generally planar bottom surface and having two parallel lateral side edges comprising a leading edge and a trailing edge and having opposite first and second end edges;

information receiving and displaying means fixedly attached to said bottom surface of said member for receiving and displaying information particular to a person wearing the device;

wherein said information receiving and displaying means comprises means for receiving and displaying information transcribed thereon by a writing instrument such as a pen or pencil and wherein said information receiving and displaying means is adapted to maintain said transcribed information in readily readable form after exposure of said information displaying means to conditions associated with wearing of said device including perspiration and frictional contact with the wearer and wherein said information receiving and displaying means comprises hot stamped plastic film;

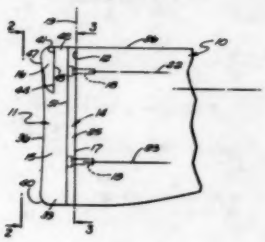
nondestructably releasable attachment means for attaching said first end portion of said device to said second end portion of said device for providing an annular configuration for positioning said device in encompassing relationship about a wearer's limb, said top surface of said member being positioned outwardly and said bottom surface of said member being positioned inwardly whereby information provided on said information receiving and display means is not readily viewable without removal of said device from the wearer.

4,956,932

GUN RECOIL PAD

Carl J. Cupp, Hawaiian Gardens, Calif., assignor to Pachmayr Ltd., Monrovia, Calif.

Filed Oct. 16, 1989, Ser. No. 422,084
Int. Cl.[5] F41C *23/08*
U.S. Cl. 42—74 10 Claims



1. A recoil pad to be attached to a shoulder gun, comprising:

a forward plate containing upper and lower openings and adapted to be secured to the buttstock of the gun by upper and lower screws extending through said openings respectively and into the buttstock;

a body of elastomeric material which is secured to the back of said forward plate and which is softer than said forward plate and resiliently deformable to absorb recoil forces;

said elastomeric body containing upper and lower passages rearwardly opposite said upper and lower openings respectively in said forward plate to receive a tool for connecting said screws to the buttstock;

a rear member which is formed of a material harder than said elastomeric body and which is embedded in the back of said elastomeric body at the upper end thereof;

said rear member having two side portions extending downwardly in spaced relation at opposite sides of said upper passage in the elastomeric body and defining between said side portions a bottom recess in said member allowing access through said upper passage to said upper screw;

said elastomeric body having a lower portion with a rear surface formed of said resiliently deformable elastomeric material and adapted to engage a user's clothing in the shoulder area;

said rear member having a back surface formed of said harder material merging with and forming a smooth upper continuation of said rear surface of said lower portion of the elastomeric body for engaging the user's clothing thereabove, with less friction than the elastomeric material, to facilitate sliding of the recoil pad upwardly adjacent the clothing to firing position;

said body having an upper reduced thickness portion formed of said elastomeric material which extends upwardly in front of said rear member at a location between said member and an upper portion of said plate, and which is softer than said rear member and softer than said forward plate, and which is secured to and retains said rear member and is resiliently deformable to cushion the transmission of recoil forces from said forward plate to said rear member;

said rear member being free of attachment to said forward plate except through said elastomeric body;

said upper portion of the elastomeric body having a periph-

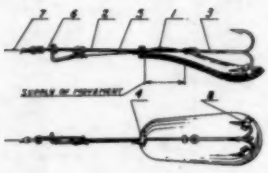
eral edge surface which is exposed between peripheral edges of said rear member and said forward plate continuously from a lower extremity of a first of said side portions of said member, at a first side of said bottom recess in said member, upwardly along said first side portion and across the top of said member and then downwardly along the second side portion of said member to a lower extremity thereof, at a second side of said bottom recess in said rear member.

4,956,933

ARTIFICIAL LURE

Konstantin Radtchenko, 235 Manhattan Ave., Jersey City, N.J. 07307

Filed Feb. 28, 1989, Ser. No. 316,808
Int. Cl.[5] A01K *85/00*
U.S. Cl. 43—42.5 6 Claims



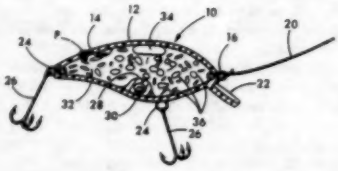
1. An artificial lure, comprising
a main body;
a thin rod provided with a hook; and
means for temporarily connecting said thin rod to said main body so that during throwing of the lure and manipulations in water said thin rod remains connected with said main body in their initial position, while under the action of setting by a fisherman to set said hook said thin rod moves relative to said main body by a predetermined distance to ensure threading of said hook in a fish mouth, said means being formed so that under the action of the setting it is destroyed.

4,956,934

FISHING LURE

Joshua R. Dahl, Rt. 2, Box 97, Bagley, Minn. 56621

Filed Jul. 17, 1989, Ser. No. 380,325
Int. Cl.[5] A01K *85/00*
U.S. Cl. 43—42.31 7 Claims



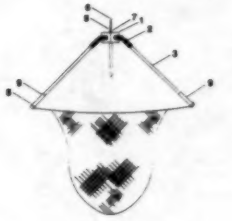
1. An artificial fishing lure composed of, a substantially hollow body having walls of transparent or lightly colored transparent plastic containing at least one chamber,
a transparent antifreeze liquid contained in at least one of the chambers,
a multiplicity of small reflective flakes contained within the liquid-filled chamber and suspended in the liquid, said flakes having a specific gravity sufficiently close to that of the liquid in which the flakes are contained so as to promote suspension thereof in the liquid to make the lure more visible, especially at night or in very deep or dark water, so as to attract fish from a greater distance,
the liquid comprises a transparent antifreezing solution having a freezing point sufficiently low to resist freezing when used for ice fishing,
said flakes comprise pieces of plastic film that have been metallized to render the pieces light reflective by electrodeposition of a metal onto a least one surface thereof to control the relative amounts of plastic and metal,
the specific gravity of the liquid and the flakes are matched such that the specific gravity of each is sufficiently close to promote suspension of the flakes in the liquid whereby the flakes remain in suspension for at least a few seconds after the lure is agitated,
means sealing each such chamber to prevent escape and/or evaporation of the antifreezing liquid such that the retention of the liquid therein prevents deposits, films, molds and/or algae from coating the inside walls of the chamber and dulling the flakes which if it occurred could reduce or destroy the effectiveness of the lure in attracting fish, and
at least one connector to which a fishing line can be attached.

4,956,935

SPRING POWERED CRAB NET

Henry N. Riddell, 204 Clyde St., Lexington, Ky. 40508

Filed Dec. 5, 1989, Ser. No. 446,445
Int. Cl.[5] A01K *713/00*
U.S. Cl. 43—105 3 Claims



1. A collapsible and expansible crab net comprising a net section attached by flexible draw-strings to the lower ends of upward-extending rigid rods whose upper ends are attached to a centrally located hub block by means of springs whose function is to allow the rigid rods to expand outwardly to hold the net open and flat when deployed upon the water bottom and said springs to allow the rods to deform downwardly when the crab net is retrieved by means of upward force upon a retrieval line attached to the hub block for that purpose.

4,956,936

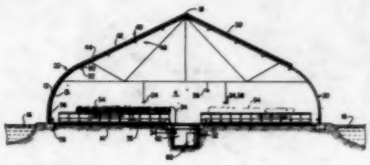
METHOD AND SYSTEM FOR PURIFICATION OF WATER FOR GREENHOUSE STRUCTURES

Philip D. Sprung, c/o 1001-10th Ave., S.W., Calgary, Alberta, Canada (T2R 0B7)

Filed Dec. 7, 1988, Ser. No. 281,189
Int. Cl.[5] A01G *9/00*
U.S. Cl. 47—17 20 Claims

13. A method of purifying water in a sealed greenhouse structure comprising the steps of
sparying water in the form of a mist into the interior of the sealed greenhouse structure;
vaporizing the mix into water vapor within the greenhouse structure;
condensing the water vapor within the greenhouse structure on an internal side of at least one wall of heat-conductive translucent material;
cooling an external side of said wall to cause condensation of

the water vapor to water on the internal side of said wall while passing the heat of condensation of the condensed water vapor to said external side of said wall; and



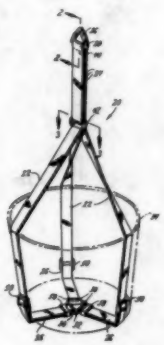
collecting the condensed water on said wall at a lower end for recycling.

4,956,937

HANGER FOR PLANT CONTAINER

Holly A. Haddox, 1001 S. Main, St. Charles, Mo. 63301

Filed Jan. 4, 1989, Ser. No. 293,217
Int. Cl.[5] A47G *7/00*
U.S. Cl. 47—67 13 Claims



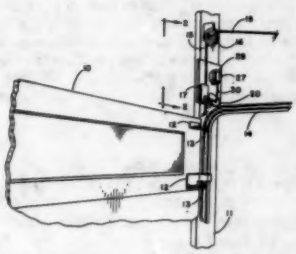
1. A hanger for suspending a plant container of the like from a fixed support, said hanger comprising a plurality of flexible straps having upper reaches terminating in upper extremities adapted for connection to said fixed support and lower reaches terminating in lower extremities adapted for disposition adjacent the plant container, support means on said lower extremities of the straps for supporting the container, each strap having an effective length defined by the distance between its upper and lower extremities, and means for adjusting the effective length of each strap independent of the adjustment of the other straps for varying the position of the plant with respect to said fixed support, each strap including an end portion and an intermediate portion, the end portion of each strap being doubled back on the intermediate portion of the strap to form a loop, said adjustment means comprising slide fastener means slideably fastening the end portion of the strap to the intermediate portion of the strap, said slide fastener means being slideable along the intermediate portion of the strap to vary the size of said loop and thereby adjust the effective length of the strap, the support means comprising the means for connecting the lower reaches of straps together int relatively close proximity to one another to form a cradle for holding the container in a position above said support means.

4,956,938

SAFETY DEVICE FOR POWER OPERATED OVERHEAD DOOR

Neaville L. DeMent, 5017 78th La. N., Brooklyn Park, Minn. 55443

Filed Jan. 16, 1990, Ser. No. 465,506
Int. Cl.[5] E05F *15/00*
U.S. Cl. 49—28 8 Claims



1. For use with a frame-enclosed power operated overhead door having an attached wire cable which moves longitudinally as the door is opened and closed and has a sensor for detecting an object in the path of the door, a safety device for immediately stopping the closing of the door when an object is detected by the sensor, said safety device comprising:

an anvil attached to the frame of the door in close proximity to the wire cable;

a cam plate pivotably mounted on the door frame with an edge of the cam plate facing the anvil with the wire cable slidably located between said edge and the anvil;

means coupled to said cam plate for pivotably biasing said cam plate so that said edge of said cam plate is away from but in close proximity to the wire cable; and

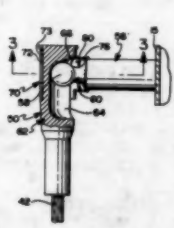
means coupled to said cam plate responsive to the sensor for pivotably moving said cam plate in opposition to said first mentioned means to bring said edge in pressing contact with the wire cable to bind the wire cable against said anvil to stop the longitudinal movement of the cable when the door is being closed.

4,956,939

RELEASABLE CONNECTOR FOR CLOSURE OPERATING MECHANISM

Howard W. Kuhlman, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 31, 1989, Ser. No. 386,748
Int. Cl.[5] E05F *11/04*
U.S. Cl. 49—347 3 Claims



1. A releasing connection device for attaching a motor driven drive element to a vehicle body closure, comprising:

a pin having a head supported by a necked down stem attached to the closure;

a housing member connected to the motor driven drive

element and having an opening in a lateral wall thereof receiving the head of the pin and a ramp surface formed on the housing member and within the opening and being engaged by the head of the pin upon imposition of force on the housing member so that the force imposed is resolved in the direction to urge the head of the pin outwardly of the opening;

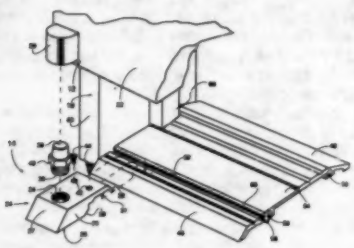
and a spring clip immovably mounted on the housing and having yieldable means of one-piece integral construction therewith engaging the head of the pin to retain the pin in the housing member and thereby effect a connection between the motor driven drive element and the vehicle body closure, said spring clip yielding in response to a predetermined level of force imposed whereby the pin is released form the housing member to disconnect the drive member from the closure.

4,956,940

BOTTOM OFFSET DOOR PIVOT AND SPLINE THRESHOLD

Charles P. Touton, III, Buford, Ga., assignor to Kawneer Company, Inc., Norcross, Ga.

Filed May 28, 1990, Ser. No. 500,688
Int. Cl.[5] E05D 7/08
U.S. Cl. 49—388 **6 Claims**



1. An apparatus for pivotably supporting a lower portion of a door, comprising:

a threshold having an axis of elongation, said threshold having a keyway formed therein in a direction generally parallel to said axis of elongation;

an offset door pivot body configured to abut said threshold, said pivot body having a pivot spindle projecting upwardly therefrom for pivotably mounting a lower portion of a door to said body; and

a hook formed on said pivot body and configured to mechanically hook into said keyway in said threshold, said hook being disposed relative to said pivot spindle such that when said hook engages said keyway said pivot spindle is properly offset with respect to said threshold.

4,956,941

FRONT LOADING FLUSH GLASS RUN SYSTEM

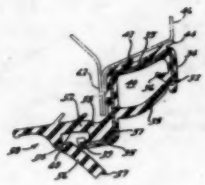
Robert A. Vaughan, Dearborn, Mich., assignor to The Standard Products Company, Cleveland, Ohio

Continuation of Ser. No. 296,801, Jan. 12, 1989, abandoned. This application Feb. 27, 1990, Ser. No. 488,432
Int. Cl.[5] E06B 7/16
U.S. Cl. 49—440 **11 Claims**

1. A glass run assembly comprising:

frame means defining a channel for receiving a vehicle window for enabling up and down movement of the window in said channel said frame means including a polymeric skin surrounding said frame means;

means for securing said frame means to a flange of a vehicle door, said securing means including a deflectable portion enabling said frame means to be front loaded onto said flange, said deflectable portion including means for rigidifying said deflectable portion to secure to said flange, and said securing means unitarily formed with said polymeric skin surrounding said frame means; and



means for providing a mounting surface for a side view mirror, said mounting surface means coupled with said frame means.

4,956,942

WINDOW ADJUSTMENT MECHANISM

Stephen P. Lisak, and Harold L. Purdy, both of Arab, Ala., assignors to Textron Inc., Rockford, Ill.

Filed Jun. 9, 1989, Ser. No. 364,012
Int. Cl.[5] B60J 1/00
U.S. Cl. 49—502 **13 Claims**

1. A window adjustment apparatus for use with an automotive vehicle type of window assembly of the type having an elongate guide channel defining a longitudinal axis and which mounts a window for reciprocal motion relative to a vehicle body panel such as a vehicle door, and a pivot arrangement which mounts said guide channel for pivotal movement generally about one end thereof and within said vehicle body panel in which said guide channel is located, said window adjustment apparatus comprising: housing means; an adjustment member having channel-coupling means for coupling thereof to said guide channel at a location thereon generally remotely located from the end about which said guide channel is mounted for pivotal motion; a driven member mounted to said adjustment member; drive means rotatably mounted to said housing, said drive means being of complementary form with said driven member for engaging the same for causing bidirectional movement of said adjustment member relative to said housing to achieve said bidirectional pivoting of said guide channel in response to bidirectional rotation of the drive means; and engageable means for engagement and bidirectional rotation by means acting from exteriorly of the body panel and operatively coupled with said drive means, such that bidirectional rotation of the engageable means achieves a pre-

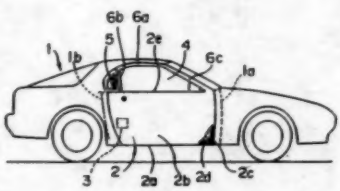
determined and corresponding amount of bidirectional pivotal motion of the guide channel; wherein said engageable means comprises a gear member nonrotatably coupled with said drive means; wherein said gear has a tool-engageable portion accessible for engagement and rotation by a mating tool; and wherein said housing includes an entry port in alignment with said tool-engageable portion of said gear for permitting the ingress of a mating tool for rotating the same.

4,956,943

AUTOMOBILE SIDE DOOR ASSEMBLY

Kiyoshige Yamada; Takashi Mizuma, and Kohji Kishino, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Feb. 20, 1990, Ser. No. 481,558
Claims priority, application Japan, Feb. 20, 1989, 1-39695
Int. Cl.[5] E06B *3/00*
U.S. Cl. 49—503 **7 Claims**



1. A side door assembly in an automobile body structure for selectively opening and closing an access opening leading into the interior of the automobile body structure, which assembly comprises:

a generally rectangular double-walled door panel structure including outer and inner panels connected together to define a windowpane chamber therebetween while leaving a windowpane slot at an upper edge of the door panel structure;

a windowpane supported for movement between elevated and lowered positions, said windowpane in said lowered position being substantially concealed within the windowpane chamber;

a window sash mounted on the door panel structure and extending above the windowpane slot so as to define a window, said windowpane in said elevated position closing the window, said window sash having a generally upwardly extending front sash portion, a generally rearwardly extending sash portion continued from an upper end of the front sash portion and a generally downwardly extending rear sash portion continued from a rear end of said rearwardly extending sash portion;

a bezel mounted on the door panel structure at a location rearwardly of the downwardly extending sash portion;

a door handle supported by the bezel for movement between a released position at which the side door assembly is in position to open the access opening, and a locked position at which the side door assembly is in position to close the access opening; and

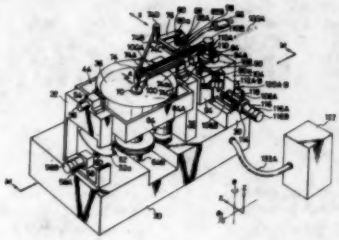
a weather strip fitted to the rearwardly extending sash portion and a rear edge of the bezel so as to continue from the rearwardly extending sash portion down to a rear edge of the door panel structure by way of the rear edge of the bezel.

4,956,944

POLISHING APPARATUS

Manabu Ando; Nobuo Nakamura; Yoshitane Tsuchiya, all of Yokohama; Hirotaka Fuse, Tsuchiura; Kazuo Watanabe, and Koushi Shinoda, both of Ushiku, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 168,001, Mar. 14, 1988, abandoned. This application Aug. 29, 1989, Ser. No. 401,477
Claims priority, application Japan, Mar. 19, 1987, 62-62592; Mar. 19, 1987, 62-34808
Int. Cl.[5] B24B *49/00*
U.S. Cl. 51—165.71 **6 Claims**



1. A polishing apparatus for polishing a work piece having a curved surface comprising:

holding means for holding a tool on the curved surface of the work piece to be polished;

first moving means for moving the tool to a polishing position in a radial direction on the curved surface;

pivoting means for pivoting the work piece, said pivoting means providing a pivot axis positioned on a line connecting a center of curvature of the curved surface and an uppermost portion of the curved surface, and pivoting the work piece around said pivot axis by a pivot angle corresponding to a distance between said uppermost portion and said polishing position;

a control unit for outputting information of an amount of movement of the tool with respect to the pivot angle of the work piece;

second moving means for moving the tool in an axial direction of the work piece in accordance with said output information so that an axial direction of the tool coincides with a direction normal to the work piece at said polishing position; and

force adjusting means for adjusting a pressing force of the tool on the work piece with said force adjusting means having a balance member held by said second moving means for adjusting the pressing force applied to the work piece.

4,956,945

INTERNAL GRINDER

Jinichiro Ooshima, Narashino, Japan, assignor to Seiko Seiki Kabushiki Kaisha, Japan

Filed Mar. 14, 1989, Ser. No. 324,228
Claims priority, application Japan, Mar. 18, 1988, 63-65099
Int. Cl.[5] B24B *49/00*
U.S. Cl. 51—165.93 **24 Claims**

1. An internal grinding machine comprising;

a spindle rotor having a grinding wheel fixed at one end thereof through a grinding wheel shaft;

a spindle head encompassing said spindle rotor;

rotational driving means for rotationally driving a workpiece having a bore about an axis of rotation parallel with the bore;

feeding means for providing relative movement between said grinding wheel and the workpiece;

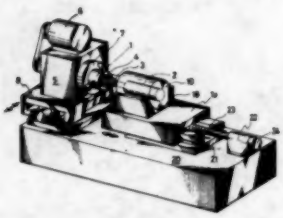
electromagnetic bearing means coupled with said spindle

rotor for magnetically floating and supporting said spindle rotor;

sensing means for detecting a position of said spindle rotor relative to said electromagnetic bearing means;

means for sensing the axial position of the grinding wheel relative to a surface of the bore;

calculating means for calculating a predetermined tilt angle of said grinding wheel relative to the axis of rotation of the



workpiece for different axial positions of said grinding wheel relative to a surface of the bore in the workpiece and including means for storing data corresponding to the tilt angle for each relative position; and

control means for controlling said electromagnetic bearing means to tilt the axis of said spindle rotor at the calculated predetermined tilt angle of said grinding wheel for the said positions sensed by the means sensing the axial position of the grinding wheel relative to the surface of the bore.

4,956,946

NUMERICALLY CONTROLLED GRINDING MACHINE

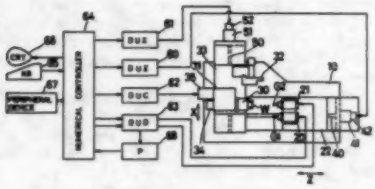
Toshio Tsujiuchi, Kariya; Norio Ohta, Okazaki, and Masatomo Yoshimura, Toyoake, all of Japan, assignors to Toyoda Koki Kabushiki Kaisha, Kariya, Japan

Filed Mar. 13, 1989, Ser. No. 322,300

Claims priority, application Japan, Mar. 15, 1988, 63-60794

Int. Cl.[5] B24B *49/05*

U.S. Cl. 51—165.71 **11 Claims**



1. A numerically controlled grinding machine having a wheelhead slide supporting a rough grinding wheel and a finish grinding wheel, and a spindlehead slide supporting a workpiece, in which relative movement is produced between said wheelhead and spindlehead slides and said workpiece according to numerical data in order to grind said workpiece by a rough grinding operation with said rough grinding wheel and a finish grinding operation with said finish grinding wheel, said numerically controlled grinding machine comprising:

means for detecting a grinding load of said finish grinding wheel at the beginning of said finish grinding operation in order to indirectly detect the amount of unground portion remaining after the rough grinding operation;

means for determining a compensation value based upon said grinding load detected by said grinding load detecting means; and

means for compensating the relative positional relationship between said rough grinding wheel and said workpiece according to said determined compensation value in a next rough grinding operation for a next workpiece in order to keep the amount of unground portion remaining after the rough grinding operation constant.

4,956,947

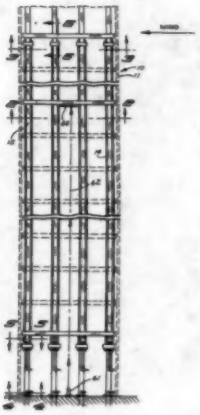
LIVE TENDON SYSTEM INHIBITING SWAY OF HIGH RISE STRUCTURES AND METHOD

Leonard E. Middleton, 2907 N. 22nd Ave. W., Duluth, Minn. 55811

Continuation-in-part of Ser. No. 176,083, Apr. 1, 1988, abandoned. This application Oct. 16, 1989, Ser. No. 422,043

Int. Cl.[5] E02D *27/34*

U.S. Cl. 52—1 **16 Claims**



1. A live tendon automatically self operable control system inhibiting sway and oscillation in a structure deflected by a lateral force, having in combination

a structure subject to deflection comprising a framework of stabilizing members,

a plurality of elastic steel rod tendons extending along preselected of said stabilizing members,

a programmed self operable controller,

tensioning means operatively connected with said tendons and in circuit with and activated by said controller,

sensing means in circuit with said controller indicating the deflection of said structure,

said sensing means comprising a graduated grid of sensors,

a steady beam focused upon the center of said grid,

said sensing means being arranged and adapted to indicate to said controller a measured extent and direction of deflection of said structure relative to the position of said beam, whereby

said sensing means causes said controller to activate said tensioning means to counter the effect of said lateral force in deflecting said structure.

4,956,948

CLOG RESISTANT GUTTER-DOWNSPOUT CONNECTION UNIT

Richard Hart, 3497 Citrus Dr., Duluth, Ga. 30136

Filed Oct. 19, 1989, Ser. No. 424,528

Int. Cl.[5] E04D *13/08*

U.S. Cl. 52—16 **10 Claims**

1. An improved gutter-downspout connection unit comprising

first and second upper body sides and first and second end pieces, each of the upper body sides and end pieces having an upper edge, a lower edge and two side edges, the first

and second upper body sides being substantially flat and located opposite and substantially parallel to each other, the first and second end pieces being located opposite each other with at least one of the end pieces having a smooth curvature which is convex inward continuously toward the other end piece about a longitudinal axis located outside of the unit until said end pieces are substantially parallel to each other;

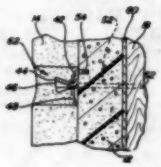
wherein the upper body sides and the end pieces adjoin each other along the side edges forming a unitary, generally hollow structure such that the upper edges of the upper body sides and the end pieces form a first common edge defining a top opening, and the lower edges of the upper body sides and the end pieces form a second common edge defining a bottom opening, said bottom opening being substantially opposite the top opening.

4,956,949

BRICK PANEL WALL CONSTRUCTION

Gerald T. Francis, 41757 Onaway Dr., Northville, Mich. 48167, assignor to Gerald T. Francis, Northville, Mich.

Filed May 25, 1989, Ser. No. 357,133
Int. Cl.[5] E04F *13/08*; E04C *1/14*
U.S. Cl. 52—38 **20 Claims**



1. A brick panel wall construction having a plurality of brick panels, said brick panels being secured to supporting structure, each brick panel including a backing board having a plurality of bricks secured thereto in a pattern with adjacent bricks separated by mortar joints said mortar joints having a back wall and side walls;

at least one fastening means having a body portion mounted in said mortar joint between adjacent bricks said body portion being defined by a generally planar surface, said planar surface being juxtaposed with said back wall, said body portion having at least two attaching means, a first attaching means for attaching said body portion to said supporting structure and a second attaching means for attaching said body portion to said backing board said second attaching means extending only partially into said backing board; and

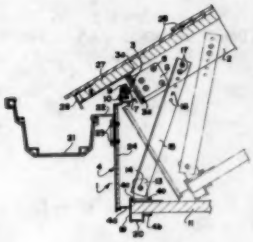
mortar applied to said mortar joint to cover said fastening means.

4,956,950

ASSEMBLY OF EAVES FASCIA

Norio Hirose, Gifu, Japan, assignor to Sunrail Co., Ltd., Gifu, Japan

Filed Dec. 27, 1988, Ser. No. 290,150
Claims priority, application Japan, Feb. 8, 1988, 63-15536[U]; Feb. 8, 1988, 63-15537[U]; Mar. 15, 1988, 63-34304[U]
Int. Cl.[5] A63H *23/04*; E04D *13/00*
U.S. Cl. 52—94 **6 Claims**



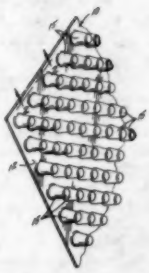
1. An assembly of fascia which comprises a fascia board for a building having outer walls, roof eaves, and rafters arranged in said roof eaves and having outer ends, said fascia board being adapted to conceal said outer ends of said rafters, an eaves soffit board inward and outward ends, said soffit board being set apart under said eaves for obstructing a view of the inside of said eaves from below, an inward end of the soffit board being fixed to an outer wall of the building, a curtain board for linking said fascia board and the outward end of said soffit board for masking a gap between the eaves and the soffit board, said fascia board has an outer side which is provided longitudinally and integrally with an outward protrusion having an upwards open concave groove for supporting said curtain board, an upper end portion of said curtain board being bent downward and provided at its extreme edge longitudinally and integrally with a handle portion to associate with said groove of the protrusion, said fascia board and said curtain board have a joint which is adapted to enable the curtain board to move relative to and around the fascia board, whereby the curtain board can be supported even when tilted, by the fascia board.

4,956,951

LAMINATED SHEET FOR PROTECTING UNDERGROUND VERTICAL WALLS

Charles P. Kannankeril, North Caldwell, N.J., assignor to Sealed Air Corporation, Saddle Brook, N.J.

Filed Jun. 26, 1989, Ser. No. 371,511
Int. Cl.[5] E02D *31/02*
U.S. Cl. 52—169.5 **34 Claims**



1. A laminated sheet useful to facilitate the drainage of

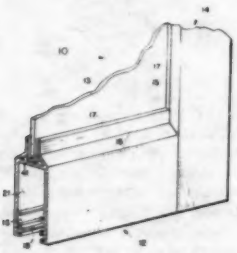
ground water to protect underground vertical walls and foundations when placed thereagainst, said laminated sheet having an array of spaced apart projections extending laterally outwardly from one side thereof and forming a series of drainage channels, and comprising a layer of crystalline polystyrene providing compression strength and creep resistance properties to said laminated sheet and at least one non-pervious layer of a polyolefin laminated to said crystalline polystyrene layer and providing chemical and impact resistance to said laminated sheet.

4,956,952

UNIVERSAL DOOR PANEL SYSTEM

Joseph C. Bancroft, 812 Sweetwater Blvd., Longwood, Fla. 32779

Filed Aug. 17, 1989, Ser. No. 394,888
Int. Cl.[5] E06B *1/04*
U.S. Cl. 52—207 **12 Claims**



1. A universal door panel for installation in a door frame for a patio door or the like, said door frame including a sill member having a first track and a second track, comprising:

(a) a pair of fixed panel adapters, each having

(i) a body portion, and

(ii) an arcuate channel along a lower edge thereof;

(b) a pair of wheel assemblies, each having

(i) a body portion, and

(ii) a wheel operatively disposed in said body portion, said wheel having an arcuate periphery; and

(c) a door panel metal frame having a hollow sill member, wherein said pair of fixed panel adapters, or said pair of wheel assemblies selectively wholly fitting within said hollow sill member;

(d) whereby said panel frame may be configured to provide either a fixed door panel or a sliding door panel.

4,956,953

OFFICE PANEL SYSTEM INCORPORATING IMPROVED LOCKING AND ALIGNMENT MECHANISM

Norman H. Bates, 1182 Hyde Park, Santa Ana, Calif. 92705

Filed Mar. 8, 1989, Ser. No. 320,758
Int. Cl.[5] E04B *2/74*
U.S. Cl. 52—239 **20 Claims**

1. A panel system, which comprises:

(a) first and second office panel sections each having a vertical end that it is desired to connect to the vertical end of another office panel section, and so that said first and second office panel sections will be aligned and coplanar,

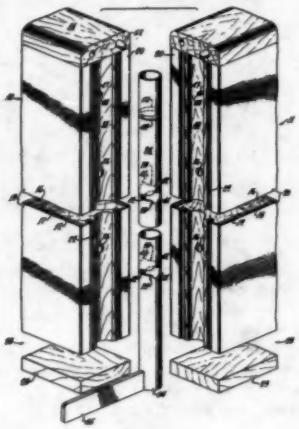
(b) projecting elements provided on each of said ends in vertically-spaced relationship,

(c) an elongate connector and alignment element disposed in vertical relationship between the opposed vertical ends of said first and second panel sections to cooperate with said projecting elements in connecting said ends together, and in aligning said panel sections relative to each other,

(d) means on said connector and alignment element to interact with said projecting elements to effect said connection of said ends to each other and to effect said alignment of said panel sections,

characterized in that said last-named means effects said connection and alignment in response to rotation of said connector and alignment element about the longitudinal axis thereof,

further characterized in that said projecting elements and said last-named means are so shaped and related that



said rotation of said connector and alignment element effects pulling of said panel sections towards each other, and

(e) means on said first and second panel sections to come into abutment with each other in response to said pulling of said panel sections towards each other,

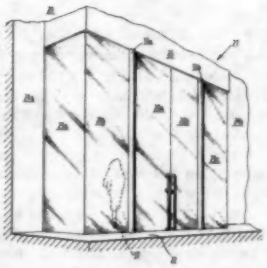
said last-named means being so disposed that the connected panel sections are maintained in substantially the same plane, without the necessity of relying on friction.

4,956,954

DOORWAY SYSTEM FOR GLASS DOORS AND METHOD OF INSTALLATION

William J. Horgan, Jr., Pittsburgh, Pa., assignor to Blumcraft of Pittsburgh, Pittsburgh, Pa.

Filed Mar. 17, 1989, Ser. No. 325,226
Int. Cl.[5] E05D *7/08, 11/06*
U.S. Cl. 49—381 **11 Claims**



1. A header system for a building which includes a floor and a ceiling and a door or a panel extending therebetween comprising:

a channel attached to the ceiling, said channel having a

longitudinally extending slot therethrough with opposed inner side walls jointed by a center wall; at least one first projection of pre-determined size extending from each side wall opposite one another and adjacent said center wall to form a track therebetween; and at least two right-angular projections extending from each said side walls with the right angles facing one another to form a pocket-area spaced apart from said track and adjacent each said side wall; wherein filler means comprising a slidable and lockable platform, having at least one aperture therethrough, and being movable in said track is held between said walls and stop means is attached to a face of said filler means to halt door rotation.

4,956,955

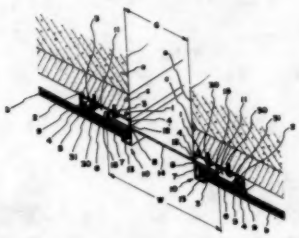
EXPANSION JOINT DEVICE FOR USE IN INTERIOR DESIGNS

Toshikazu Ohmatsu, 178-1 Bonsai-cho, Ohmiya, Saitama, Japan

Filed Feb. 24, 1989, Ser. No. 315,059

Int. Cl.[5] E04B *1/68*

U.S. Cl. 52—396 **13 Claims**



1. An expansion joint for mounting building panels within the vicinity of an expansion joint gap defined between two building structures, comprising:

base frame members secured to said two building structures;

cover frame members secured to said base frame members in spaced relationship with respect thereto so as to define cavities therebetween;

an expansion joint covering plate having a width greater than said gap defined between said two building structures and having opposite side edge portions thereof slidably disposed within said cavities so as to cover said gap defined between said two building structures under expansion and contraction conditions; and

channel means provided upon said cover frame members for housing side edge portions of said building panels in order to mount said building panels upon said building structures.

4,956,956

CONNECTOR FOR CONNECTING TWO ELEMENTS

Friedrich Maier, Leonberg, Fed. Rep. of Germany; Fredi Dubach, Adetswil, Switzerland; Erich Röck, Höchst, and Klaus Briistle, Lauterach, both of Austria, assignors to Julius Blum Gesellschaft m.b.H., Höchst, Austria

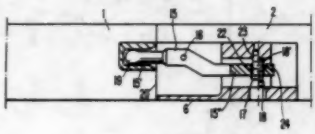
Continuation-in-part of Ser. No. 184,618, Apr. 21, 1988, abandoned, and a continuation-in-part of Ser. No. 337,402, Apr. 13, 1989, abandoned. This application Oct. 18, 1989, Ser. No. 423,032

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1987, 3713483; Austria, May 22, 1987, A1313/87; European Pat. Off., Apr. 16, 1988, 88106117.0; Austria, Jun. 17, 1988, A1571/88

Int. Cl.[5] E04C *5/16*

U.S. Cl. 52—584 **57 Claims**

1. In a connector for connecting two structural elements, particularly for the endwise connection of two panels, said connector including a pair of fitment members to be mounted on respective of the structural elements in the region of connection therebetween, a tie anchor and associated clamping means for applying a pulling force on said fitment members in a first direction to clamp said fitment members together, and adjusting means for adjusting the relative positions of said fitment members, and thereby of the structural elements to be connected, in a second direction perpendicular to said first direction, the improvement wherein said adjusting means comprises:



a lever pivotally mounted in a first said fitment member for pivotal movement about an axis extending in a third direction perpendicular to both said first and second directions, said lever having a first end to extend into a second said fitment member; and

rotatable means operable between said first fitment member and a second end of said lever for pivoting said lever about said axis.

4,956,957

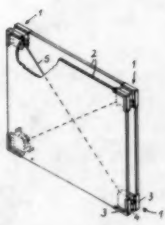
DEVICE FOR ASSOCIATING A PAIR OF PLANAR PARALLEL PANELS

Aldo Vandini, Bologna, Italy, assignor to Koaladesign S.r.L., Italy

Filed Oct. 17, 1988, Ser. No. 258,527

Int. Cl.[5] E04C *1/10*

U.S. Cl. 52—584 **5 Claims**



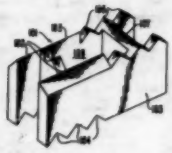
1. Device for associating a pair of planar parallel panels particularly to provide walls for exhibition stands and the like, comprising a pair of profiled elements and a spacer block arranged between said profiled elements and connected therewith, each profiled element comprising a plate having a right angle and an outer edge extending along two sides of said plate enclosing said right angle, said plate and edge defining a groove into which a corner of said panels engages, said spacer block including a seat and a sylinder being rotatably accommodated in said seat according to an axis perpendicular to said plates, said cylinder being provided with means for anchoring one end of a tensioning member extending between said pair of panels and having the opposite end associated to a similar device applied in diagonally opposite corners of said panels.

4,956,958

AUTOFITTING BUILDING BLOCKS AND BRICKS

Gino P. N. Caroti, 56 Mayflower Dr., Wilton, Conn. 06897

Filed Feb. 15, 1989, Ser. No. 311,088
Int. Cl.[5] E04B *5/04*
U.S. Cl. 52—605 17 Claims



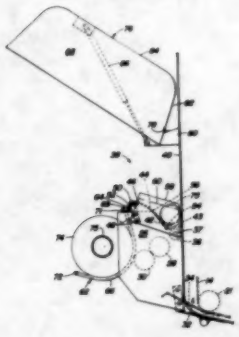
1. A building block comprising a block having two opposing side surfaces, two opposing end surfaces, a top surface and a bottom surface, said top surface having a plurality of first dihedral projections each having a first load-supporting side surface and a second load-supporting side surface and extending longitudinally along the block, said bottom surface having a plurality of first dihedral recessions extending longitudinally along the block, wherein said bottom surface has at least one more of said first dihedral recessions than the top surface has of said first dihedral projections, wherein one of said first dihedral projections adjoins one of said two opposing side surfaces, and another of said first dihedral projections adjoins the other of said two opposing side surfaces.

4,956,959

HOUSING FOR HOLDING A SUPPLY ROLL OF LARGE ROUND BALE WRAP MATERIAL

George W. Rumph, Bloomfield, and Henry D. Anstey, Ottumwa, both of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Jun. 23, 1989, Ser. No. 370,552
Int. Cl.[5] B65B *11/30, 27/12;* B65H *19/00*
U.S. Cl. 53—118 11 Claims



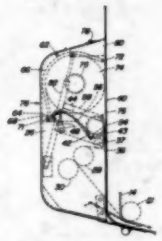
1. In a large round baler including a bale-forming chamber defined in part by a bale discharge gate, a support structure connected to a lower rear portion of the bale discharge gate, a bale wrapping mechanism mounted to the support structure and including a wrap material supply roll housing adapted for holding a supply roll from which wrap material may be pulled during wrapping of a bale formed in the chamber, the improvement comprising: said housing having a bottom wall extending transversely behind said discharge gate having an upwardly facing roll support surface extending between front and rear ends of the bottom wall and being fixed to said support structure; and a roll loading arm being vertically pivotally mounted directly to said support structure for rotation about a horizontal transverse axis located adjacent a rear end portion of the support surface, said arm being shaped to form cradle means for receiving and supporting a roll of wrap material at a level below said pivot axis, when the arm is in a lowered loading position, and for depositing a cradled roll of wrap material onto the support surface when the arm is pivoted from its loading position to a raised discharge position.

4,956,960

HOUSING FOR HOLDING A SUPPLY ROLL OF LARGE ROUND BALE WRAP MATERIAL

Henry D. Anstey, Ottumwa, and George W. Rumph, Bloomfield, both of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Jun. 23, 1989, Ser. No. 370,537
Int. Cl.[5] B65B *11/30, 13/22, 27/12;* B65H *19/00*
U.S. Cl. 53—118 9 Claims



7. In a large round baler including a bale discharge gate having a pair of transversely spaced sidewalls and a wrapping mechanism including a pair of support walls respectively connected to lower rear portions of the pair of side walls, said mechanism including an improved wrap material supply roll housing, comprising: an upright front wall extending between and being fixed to said sidewalls; a bottom wall means extending transversely behind and being sloped upwardly and rearwardly relative to the front wall and including a transverse forward end spaced rearwardly of said front wall and cooperating with the latter to define a wrap material passage therebetween; and said bottom wall means cooperating with said front wall to define brake means for resisting the unwrapping of wrap material from a wrap material supply roll resting on the bottom wall means by a substantially constant force throughout the usage of the roll as the latter decreases in weight and diameter.

4,956,961

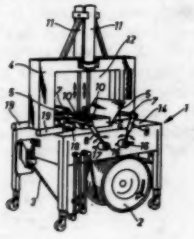
APPARATUS FOR WRAPPING AND CLOSING A BOOK PACKAGE

Veikko I. Janhonen, Jorvas, Finland, assignor to Pussikeskus Oy, Helsinki, Finland

Filed May 12, 1989, Ser. No. 351,872
Claims priority, application Finland, May 19, 1988, 882347
Int. Cl.[5] B65B *11/02, 13/22*
U.S. Cl. 53—176 4 Claims

1. An apparatus for wrapping and closing a package around a book, said apparatus having a base to support the material to be wrapped about the book, a holding element movable to seat against the book for holding it firmly against the wrapping material, said holding element having a pair of press members, means mounting said press members spaced apart from each other sufficiently to permit a strapping tape to be passed between them, a pair of folding means one on each of opposite sides of the book and each having a portion underlying the wrapping material, actuator means connected to said folding means to move said portions upwardly and inwardly to fold

the ends of said material against the opposite edges of the book and then into overlapping relationship over the top of the book, actuator means for withdrawing said holding element



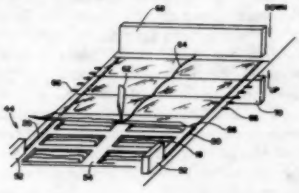
after said portions have urged said wrapping against the opposite edges of the book and to move said holding element again into engagement with the overlapped ends of the wrapping material to hold it firmly ready for strapping.

4,956,962

METHOD OF MAKING RECLOSABLE SEALED PACKAGE

Roger S. Williams, Calhoun, Ga., assignor to Bryan Food, Inc., West Point, Miss.

Filed Jul. 14, 1989, Ser. No. 379,913
Int. Cl.[5] B65B *9/04, 31/02, 47/00*
U.S. Cl. 53—433 **15 Claims**



1. A method of forming a package having a product hermetically enclosed therein between a pair of sheets of thermoplastic material and having a readily peelable reclosable seal, said method comprising:

(a) feeding a first sheet of thermoplastic material,

(b) placing said product upon a surface of said sheet,

(c) dispensing a peelable pressure sensitive adhesive having re-adhering properties onto said surface at a peripheral area of said sheet adjacent said product,

(d) thereafter laying a cover sheet of material upon said first sheet so that said covering material overlays and adheres to said adhesive and forms a peelable resealable seal and overlays said product and the remainder of said first sheet,

(e) thereafter joining the first and second sheets together peripherally about said product at all but a second peripheral area of said sheet spaced from said adhesive adjacent said product, and

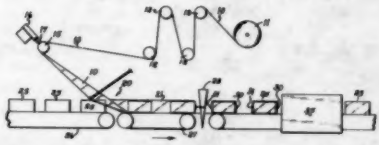
(f) thereafter evacuating said package and permanently sealing the first and second sheets together about said second area.

4,956,963

METHOD OF SEALING A SHRINK WRAP PACKAGE

Stephen N. Johnson, Mechanicsville, Va., assignor to Nordson Corporation, Westlake, Ohio

Filed Nov. 14, 1988, Ser. No. 271,024
Int. Cl.[5] B65B *9/06, 53/02*
U.S. Cl. 53—442 **6 Claims**



1. The method of wrapping a package comprising the steps of:

applying a light deposit of pressure-sensitive hot melt adhesive to at least one edge of a polyvinylchloride heat-shrinkable film;

wrapping an article with said film;

bringing together opposed edges of said film with said adhesive between said edges; and

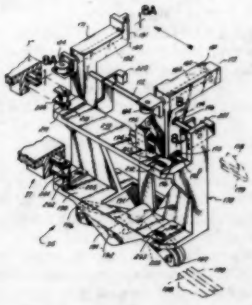
heating said film to shrink it about said article and to cause the adhesive to flow to form a more complete bond between said opposed edges.

4,956,964

ADJUSTABLE POUCH FORM, FILL, SEAL MACHINE

Wickliffe Jones, deceased, late of Cincinnati, Ohio (by Martha W. Jones, Executrix); Eric W. Scarpa, Cincinnati, Ohio; Joseph D. Greenwell, Florence, Ky.; Mark R. Nease, Lakeside Park, Ky.; Robert M. Kalany, Florence, Ky., and Michael E. Myers, Bellevue, Ky., assignors to R. A. Jones & Co. Inc., Covington, Ky.

Filed Mar. 13, 1989, Ser. No. 323,365
Int. Cl.[5] B65B *43/26*
U.S. Cl. 53—570 **13 Claims**



1. A gripper unit for gripping the sealed edges of flat pouches comprising:

a frame having opposed vertical sides,

vertically spaced horizontal bars fixed in said vertical sides,

a leading gripping jaw fixed to one of said vertical sides,

a trailing gripping jaw slidably mounted on said bars and frictionally gripping said bars,

means for sliding said trailing jaw on said bars to position it for pouch opening and filling operations.

4,956,965

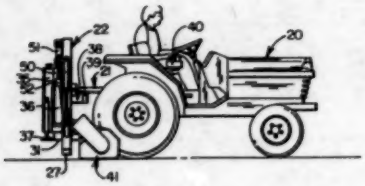
BOOM MOWER ATTACHMENT FOR A TRACTOR ADJUSTABLE FOR CUTTING AT EITHER SIDE THEREOF

Ralph L. Parsons, Jr., 1795 Olmstead Rd., West Jefferson, Ohio 43162

Continuation-in-part of Ser. No. 228,232, Aug. 4, 1988, Pat. No. 4,912,916, which is a continuation-in-part of Ser. No. 156,816, Feb. 17, 1988, Pat. No. 4,887,417. This application Oct. 10, 1989, Ser. No. 418,669

Int. Cl.[5] A01D *34/66, 34/86*

U.S. Cl. 56—15.1 **24 Claims**



1. A boom attachment for supporting a work unit comprising a support, a boom pivoted by a pivot at its inner end to said support for swinging movement,

a work unit supported on the outer end of said boom, and

means for swinging said boom about said support pivot, said swinging means comprising a cylinder and piston unit connected at a laterally outwardly extending pivot to said support and a laterally outwardly extending pivot to said boom intermediate its inner and outer ends so it will be disposed along the side of the boom in a plane spaced from that of the boom and will not interfere with movement of the boom about its said pivot to said support;

said work unit being a mower comprising a support pivoted to the boom, a plurality of vertical spindles carried by the support, a housing covering said spindles, cutters carried by the spindles in overlapping relationship to each other, and means for driving said spindles, a forwardly facing slot in said housing, said cutters being mounted in said housing to rotate with said spindles such that a part of each cutter projects forwardly through said slot during said cutter rotation.

4,956,966

HEADER FOR A COMBINE HARVESTING MACHINE

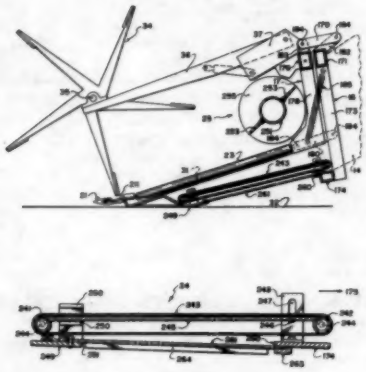
Roger L. Patterson, Manitoba, Canada, assignor to MacDon Industries Ltd., Winnipeg, Canada

Continuation of Ser. No. 209,901, Jun. 22, 1988, abandoned. This application Jan. 25, 1990, Ser. No. 470,640

Int. Cl.[5] A01D *47/00*

U.S. Cl. 56—181 **20 Claims**

1. A header for a combine harvesting machine comprising a header frame, a mounting frame including means for mounting the mounting frame fixedly on the machine for transportation of the header frame in a working direction across a field including a standing crop to be harvested, said header frame including ends thereof extending outwardly to respective sides of the mounting frame, means mounting said header frame on said mounting frame for limited vertical movement of the header frame relative to the mounting frame and limited pivotal movement of the header frame relative to the mounting frame about an axis generally parallel to the working direction such that each end of the header frame can be lifted independently of movement of the other end of the header frame, a knife arrangement extending transversely across a front edge of the header frame for cutting the standing crop, means defining a feed opening of the mounting frame through which the cut crop is guided to pass, means for transporting said cut crop inwardly from the ends of the header frame and for feeding said cut crop through said feed opening, said mounting frame including a mounting frame member fixed relative to the mounting frame and defining an edge extending across the mounting frame in front of the feed opening adjacent a lower edge of the feed opening, said header frame including a header frame member fixed relative to the header frame and defining an edge extending partly along the header frame rearwardly of said knife arrangement and substantially parallel to the edge of the mounting frame member leaving an opening between the edge of the mounting frame member and the edge of the header frame member which opening varies in dimension as the header frame moves relative to the mounting frame, a flexible pan member arranged underneath said transporting means with a forward end thereof in engagement with said header frame



member at a position rearwardly of said knife arrangement and a rearward end thereof in engagement with said mounting frame member, said vertical movement and pivotal movement of said header frame being accommodated by flexing of said pan member, means attaching the respective end of said flexible pan member to one of said header frame member and said mounting frame member, and contact maintaining means maintaining the respective end of the flexible pan member substantially continually in contact with the other of said header frame member and mounting frame member during said vertical movement and pivotal movement of said header frame so as to form a bridge across said opening between the edge of the header frame member and the edge of the mounting frame member.

4,956,967

AGRICULTURAL BALER WITH FEEDER DOOR

Cyriel R. J. De Busscher, Damme; Cornelis G. M. Muijs, Mereibeke, and Gery G. R. Verweirder, Zedelgem, all of Belgium, assignors to Ford New Holland, Inc., New Holland, Pa.

Filed Apr. 25, 1989, Ser. No. 343,457

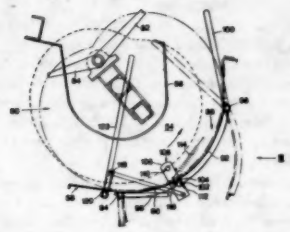
Claims priority, application United Kingdom, Apr. 28, 1988, 8810064

Int. Cl.[5] A01D *39/00*

U.S. Cl. 56—341 **6 Claims**

1. In an agricultural baler including a bale case having an inlet opening formed in a bottom wall thereof, a feeder duct communicating at one end with the inlet opening in the bale case, a pickup disposed adjacent the other end of the feeder duct, and feeder means operable to feed crop material into the feeder duct to form a wad of crop material for subsequent transfer to the bale case; wherein an improvement comprises the feeder duct being provided with a lower wall which is curved upwardly and rearwardly from the pickup to the bale

case, door means disposed in a curved portion of the feeder duct lower wall for movement between an open position and a



closed position, and releasable latch means for latching the door means in said closed position.

4,956,968

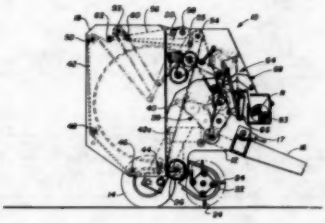
ROUND BALER WITH MECHANISM FOR DISPENSING WRAPPING MATERIAL

Kenneth R. Underhill, Strasburg, Pa., assignor to Ford New Holland, Inc., New Holland, Pa.

Filed Dec. 11, 1989, Ser. No. 448,404

Int. Cl.[5] A01D *39/00*

U.S. Cl. 56—341 **7 Claims**



1. An agricultural baler of the type for making cylindrical bales of crop material, said baler comprising:

a main frame,

a tailgate pivotally connected to said main frame;

a sledge assembly mounted on said main frame for movement between a bale starting position and a full bale position, said sledge assembly including a plurality of rollers extending transversely of said main frame;

an apron movably supported on said main frame and said tailgate, said apron cooperating with the rollers of said sledge assembly to define a bale forming chamber; and

dispensing means carried on said sledge assembly for dispensing sheet material into said bale forming chamber so that the sheet material is wrapped circumferentially around a cylindrical bale of crop material disposed in said bale forming chamber.

4,956,969

METHOD AND APPARATUS FOR CONTROLLING THE SUPPLY OF SLIVER TO THE SPINNING STATIONS OF A SPINNING MACHINE

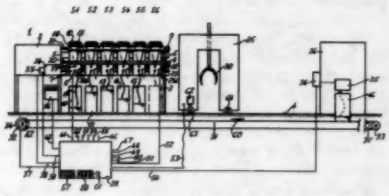
Hans Raasch, Moenchengladbach, Fed. Rep. of Germany, assignor to W. Schlafhorst & Co., Fed. Rep. of Germany

Filed Sep. 7, 1989, Ser. No. 404,340

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1988, 3831639

Int. Cl.[5] D01H *4/00, 9/00, 9/18*

U.S. Cl. 57—281 **8 Claims**



1. A method for controlling the operation of a spinning machine of the type having a plurality of stations for spinning sliver into yarn and winding yarn into packages, the sliver being drawn from cans at the stations, a sliver can filling device and a sliver can transport device for transporting empty cans to the sliver can filling device and cans with sliver therein from the sliver can filling device to the stations, the sliver can transport device and the sliver can filling device being cooperatively operated to provide sliver cans containing sliver to the stations individually during the contemporaneous operation of the stations in winding a batch of a predetermined number of packages, comprising:

supplying each spinning station with a first can of sliver;

continuously replenishing the supply of sliver at each of the stations independently by removing cans from each station as they become empty and transporting full cans to the station;

prior to completion of winding of the batch, determining an individual finishing quota of packages to be wound at each station to complete the batch, said individual finishing quota corresponding to the number of packages which can be substantially completely wound by the respective spinning station within a predetermined remaining batch running time for each station;

monitoring the winding at each spinning station during the winding of the individual finishing quota of packages to determine, for each station, the number of packages to be wound from the sliver in a final can to be transported to each station; and

in response to said monitoring, loading a quantity of sliver into each final can substantially equal to the quantity of sliver required to complete the winding of the individual finishing quota of packages at the respective spinning station, whereby the final sliver can of each spinning station is substantially empty upon completion of winding of the last full package of the individual finishing quota for the spinning station.

8. An apparatus for controlling the operation of a spinning machine of the type having a plurality of stations for spinning sliver into yarn and winding yarn into packages, the sliver being drawn from cans at the stations, comprising:

a sliver can filling device for individually filling the sliver cans with a selected quantity of sliver;

a sliver can transport device for transporting empty cans to the sliver can filling device and cans with sliver therein from said sliver can filling device to the stations, said sliver can transport device and said sliver can filling device being cooperatively operated to provide sliver cans containing sliver to the stations individually during the

contemporaneous operation of the stations in winding a batch of a predetermined number of packages;

means for determining an individual finishing quota of packages to be wound at each station to complete said batch, said individual finishing quota corresponding to the number of packages which can be substantially completely wound by the respective spinning station within a predetermined remaining batch running time for the station; and

means for monitoring the winding at each spinning station during the winding of the individual finishing quota of packages to determine, for each station, the number of packages to be wound from the sliver in a final can to be transported to each station,

said monitoring means and said sliver can filling device being operably connected to one another and said sliver can filling device being operable to load a quantity of sliver into each final can in response to said monitoring of the winding at each station, said quantity of sliver in each final can being substantially equal to the quantity of sliver required to complete the winding of the individual finishing quota of packages at the respective spinning station, whereby the final sliver can of each spinning station is substantially empty upon completion of the winding of the last full package of the individual finishing quota of the spinning station.

4,956,970

FALSE TWIST ROLL

Karl Bauer, and Hellmut Lorenz, both of Remscheid, Fed. Rep. of Germany, assignors to Barmag AG, Remscheid, Fed. Rep. of Germany

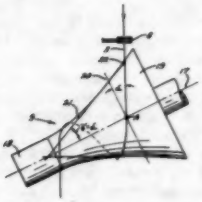
PCT No. PCT/DE88/00637, § 371 Date May 11, 1989, § 102(e) Date May 11, 1989, PCT Pub. No. WO89/03905, PCT Pub. Date May 5, 1989

PCT Filed Oct. 16, 1988, Ser. No. 360,884

Claims priority, application Fed. Rep. of Germany, Oct. 23, 1987, 3735942

Int. Cl.[5] D02G *1/08*

U.S. Cl. 57—334 **8 Claims**



1. A yarn twisting apparatus for imparting twist to an advancing yarn, and comprising

a twisting roll having a concave yarn contacting surface portion, and defining a central roll axis,

means mounting said twisting roll for rotation about said roll axis and for pivotal movement about a pivot axis which is perpendicular to said roll axis, and including means for setting said twisting roll in a selected pivotal position,

yarn guide means for guiding an advancing yarn along a predetermined yarn path leading into contact with said yarn contacting surface portion,

said concave yarn contacting surface portion being configured and said pivotal axis being located so that in all pivotal positions of said roll the angle alpha is equal to the angle gamma, with the angle alpha being defined as the angle between said predetermined yarn path and a circumferential tangent to the roll at the point of contact of the yarn path to the roll, and with the angle gamma being defined as the angle between the roll axis and a tangent to the concave surface portion at the point of contact of the yarn path to said surface portion and which intersects the roll axis.

5. A yarn twisting apparatus for imparting twist to an advancing yarn, and comprising

a twisting roll having a concave yarn contacting surface portion, and defining a central roll axis,

means mounting said twisting roll for rotation about said roll axis, for axial displacement along said central axis, and for pivotal movement about a pivot axis which is perpendicular to said central roll axis, and including means for setting said twisting roll in a selected pivotal position and in a selected axial position,

yarn guide means for guiding an advancing yarn along a predetermined yarn path leading into contact with said yarn contacting surface portion, and so as to define an angle alpha between the yarn path and a circumferential tangent to the roll at the point of yarn contact, and an angle gamma between the roll axis and a tangent to the concave surface portion at the point of yarn contact and which intersects the roll axis,

said concave yarn contacting surface portion being configured and said pivotal axis being located such that upon pivotal movement of said roll about said pivotal axis, the roll may be axially displaced along said roll axis so as to permit the yarn path of travel to be maintained unchanged, and the angle alpha maintained equal to the angle gamma.

4,956,971

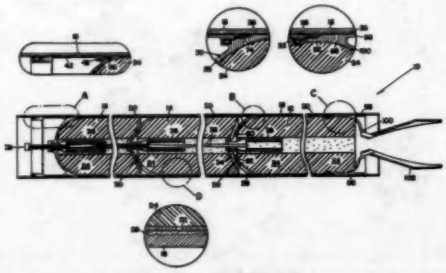
SOLID PROPELLANT CANISTER LOADED MULTIPLE PULSED OR STAGED ROCKET MOTOR

Bradley W. Smith, Ogden, Utah, assignor to Morton Thiokol, Inc., Chicago, Ill.

Filed Aug. 3, 1988, Ser. No. 227,748

Int. Cl.[5] F02K *9/28, 9/34*

U.S. Cl. 60—245 **8 Claims**



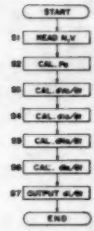
1. A rocket motor comprising a monolithic elongate generally cylindrical case having means defining an aft aperture, at least two canisters each of which has an individual case and contains an individual grain of solid propellant material, said canisters disposed sequentially within said monolithic case in end to end relation with said canister cases attached to said monolithic case and to each other, means forming a closure to preclude flow communication between said canisters which includes means providing flow communication between said canisters when a higher pressure is present in the forward one of said canisters than in the aft one of said canisters, means for igniting each of said solid propellant grains, and a thrust nozzle means attached to said monolithic case in flow communication with said aft aperture.

4,956,972

METHOD OF CONTROLLING SPEED REDUCTION RATIO FOR A CONTINUOUSLY VARIABLE SPEED TRANSMISSION

Koji Sasajima, Tokyo, and Kouji Yamaguchi, Saitama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 16, 1988, Ser. No. 286,381
Claims priority, application Japan, Dec. 18, 1987, 62-320174
Int. Cl.[5] F16H *61/42*
U.S. Cl. 60—327 4 Claims



1. A method of controlling the speed reduction ratio of a continuously variable speed transmission for transmitting engine power with continuously variable speed to drive road wheels, by detecting a parameter representing a driver's intention of acceleration or deceleration, establishing a reference engine speed corresponding to the detecting parameter, and controlling the speed reduction ratio so as to equalize an actual engine speed with said reference engine speed, at a predetermined time interval, said method comprising the steps of:

when said actual engine speed is lower than said reference engine speed, establishing a controlling output value for the speed reduction ratio for bringing said actual engine speed into agreement with said reference engine speed, based on the difference between said actual engine speed and said reference engine speed, and calculating a predicted engine speed after elapse of said predetermined time interval based on the rate of change of said actual engine speed; and

when said predicted engine speed is higher than said reference engine speed, correcting said controlling output value to lower said predicted engine speed below said reference engine speed after elapse of said predetermined time interval.

4,956,973

EXHAUST GAS RECYCLING SYSTEM FOR AN EXHAUST GAS TURBOCHARGED ENGINE

Manfred Fortnagel, Korb, and Dieter Platzer, Bissingen, both of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany

Continuation of Ser. No. 731,599, May 6, 1985, abandoned, which is a continuation of Ser. No. 491,181, May 3, 1983, abandoned. This application Feb. 28, 1986, Ser. No. 834,516
Claims priority, application Fed. Rep. of Germany, May 14, 1982, 3218156
Int. Cl.[5] F02B *37/12, 47/08*
U.S. Cl. 60—605.2 4 Claims

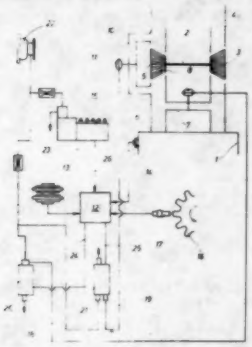
1. Exhaust gas recycling apparatus for an internal combustion engine having a combustion air intake line and an exhaust gas line and having a turbocharger which includes a turbine in the exhaust gas line and a compressor in the combustion air intake line, comprising:

an exhaust gas recycling line connecting the exhaust gas line upstream of the turbine to the combustion air intake line downstream of the compressor;

an exhaust gas recycling valve located in said exhaust gas recycling line for controlling a flow of exhaust gas from said exhaust gas line to said combustion air intake line;

a bypass line connected to the combustion air intake line at a first connecting point which is located upstream of the exhaust gas recycling line and downstream of the compressor, and at a second connecting point which is located upstream of the compressor;

a bypass control valve located in said bypass line for controlling air line pressure downstream of the compressor;



vacuum means for controlling opening and closing of said exhaust gas recycling valve and said bypass control valve such that said valves are closed during full load operation and open during partial load operation of the engine; and

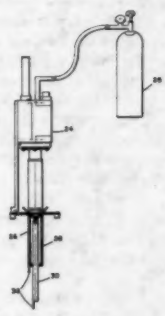
electrical control means for controlling said vacuum means in response to variations in operating characteristics of the engine.

4,956,974

REPLACEMENT METHOD AND APPARATUS FOR A CRYOGENIC REFRIGERATION UNIT

David C. Planchard, Shrewsbury, and Paul D. Lanoue, Ocean Bluff, both of Mass., assignors to Helix Technology Corporation, Waltham, Mass.

Division of Ser. No. 287,074, Dec. 20, 1984, Pat. No. 4,906,266. This application Jan. 31, 1990, Ser. No. 472,818
Int. Cl.[5] F25B *9/00*
U.S. Cl. 62—6 10 Claims



1. An apparatus for forcing gas into the housing of a refrigeration unit when the refrigeration unit is removed, wherein said housing extends into a cryogenically cooled system and said gas is delivered by said apparatus in predetermined relative

quantities to end surfaces of said housing, said apparatus comprising:

first and second concentric cylindrical members, the first cylindrical member being of larger radius than said second cylindrical member, said second cylindrical member extending beyond the first cylindrical member away from the opening of the housing into a region of the housing of different temperature than the region into which the first cylindrical member extends; and

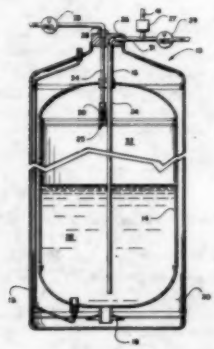
a pressurized source of heated gas with an output attached to the cylindrical members, the cylindrical member conducting the gas to and expelling the gas at opposite ends thereof.

4,956,975

SHUTOFF VALVE FOR CRYOGENIC LIQUID STORAGE TANK

Keith W. Gustafson, Station 1101, Lake Arrowhead, Waleska, Ga. 30183

Filed Aug. 17, 1989, Ser. No. 395,324
Int. Cl.[5] F17C *13/00*
U.S. Cl. 62—50.7 **3 Claims**



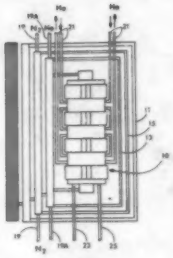
1. In a cryogenic fluid storage tank having an inner vessel for holding a cryogenic fluid in a liquid phase with a gas phase disposed above the liquid phase, an outer vessel with an insulating space between the inner and outer vessels, a sealable access port connected to the inner vessel to provide sealed access from outside the outer vessel to inside the inner vessel, an inlet tube extending from outside the outer vessel through the access port into the inner vessel, and vapor pressure relief means having a pressure relief valve outside the tank connected to a vent tube extending from outside the outer vessel through the access port into the vapor space inside the inner vessel, the improvement comprising an internal pressure relief valve comprising an enclosed housing having a sealing seat at one end attached to the vent tube and having a hole at its other end and a ball confined in the housing wherein the ball's density is greated than the liquid, and the ball's diameter and the inside diameter of the housing are dimensioned so that the momentum of the liquid flowing through the housing is sufficient to drive the ball into engagement with the seat at the top of the housing but the momentum of the gas flowing through the housing is insufficient to drive the ball into engagement with the seat at the top of the housing.

4,956,976

MAGNETIC REFRIGERATION APPARATUS FOR HE II PRODUCTION

Stephen F. Kral; John A. Barclay; Peter Claybaker, and Steven R. Jaeger, all of Madison, Wis., assignors to Astronautics Corporation of America, Milwaukee, Wis.

Filed Jan. 24, 1990, Ser. No. 469,186
Int. Cl.[5] F25B *19/00*
U.S. Cl. 62—51.3 **50 Claims**



1. Magnetic refrigeration apparatus comprising:

(a) magnetic material which exhibits the magnetocaloric effect mounted for movement;

(b) means for producing a magnetic field at a position over a portion of the magnetic material such that each point of the magnetic material can be moved into and out of the magnetic field as the material is moved;

(c) a high temperature heat exchanger located proximate the portion of the magnetic material in the magnetic field;

(d) means for conducting liquid helium through the high temperature heat exchanger;

(e) a low temperature heat exchanger located proximate the portion of the magnetic material outside the magnetic field; and,

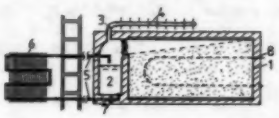
(f) means for conducting He II through the low temperature heat extractor.

4,956,977

ADSORPTION APPARATUS USED AS AN ELECTRO-HEATING STORAGE

Peter Maier-Laxhuber, Saumweberstrabe 14, D-8000 Munchen 60, and Fritz Kaubek, Gasparistrabe 5 A, D-8000 Munchen 71, both of Fed. Rep. of Germany

Division of Ser. No. 695,484, Jan. 28, 1985, Pat. No. 4,802,341.
This application Aug. 17, 1988, Ser. No. 233,269
Claims priority, application Fed. Rep. of Germany, Apr. 9, 1984, 3413349
Int. Cl.[5] F25B *17/00*
U.S. Cl. 62—106 **8 Claims**



1. A process for operating a periodic adsorption apparatus for use as an electro-heat storage provided with a heat pumping effect, said periodic adsorption apparatus being characterized by a charge phase and a discharge phase of operation, said process comprising the steps: during said charge phase of operation,

(a) desorbing water from an adsorption substance contained

in an adsorption substance container, employing heat produced from a heat producing source so as to produce vapor;

(b) liquifying said vapor into water using a condenser thereby liberating condensation heat; and

(c) discharging said condensation heat as operating heat and collecting said water in a collecting container; and during said discharge phase,

(d) removing heat from said adsorption substance so that thereupon a portion of said water in said collecting container evaporates and is exothermically absorbed in said adsorption substance, while a residual portion of said water remains in said collecting container; and

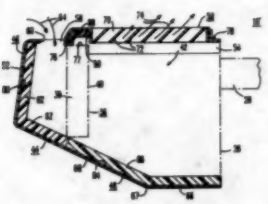
(e) pumping said residual portion of water through a heat collector using a pump, so that said residual portion of water in said heat collector absorbs heat from a heat flow presented in a heat exchanging relationship with said heat collector.

4,956,978

TRANSPORT REFRIGERATION APPARATUS HAVING SOUND REDUCTION COVER

Gregory D. Bleck, Chaska, and Peter B. Allard, Minnetonka, both of Minn., assignors to Thermo King Corporation, Minneapolis, Minn.

Filed Sep. 7, 1989, Ser. No. 404,038
Int. Cl.[5] B60H *1/32*
U.S. Cl. 62—239 **13 Claims**



1. In a transport refrigeration unit having top and bottom portions and side planes therebetween which include a front and first and second sides, a condenser having laterally disposed air intake openings located along a selected side plane of the unit, and a condenser air discharge opening at the top portion of the unit, the improvement comprising:

a sound reducing cover on said transport refrigeration unit,

said sound reducing cover being devoid of openings which emit sound directly outward from the side planes of the unit,

said sound reducing cover including means for directing air to the laterally disposed air intake openings of the condenser from the top portion of the unit,

said air intake openings of the condenser being disposed along the front of the unit, with the sound reducing cover including a substantially U-shaped front cover member, and a top cover member,

said U-shaped front cover member being the means which directs air to the laterally disposed air intake openings of the condenser,

said U-shaped front cover member including a front portion devoid of openings, and first and second side portions,

said first and second side portions contacting the first and second sides, respectively, of the transport refrigeration unit,

said U-shaped front cover member being dimensioned such that the front portion thereof is spaced outwardly from the laterally disposed condenser air intake openings to define a vertically extending condenser air inlet duct having an open upper end and a closed lower end,

said top cover member extending between the first and second side portions of the U-shaped front cover member without blocking the open upper end of the condenser air inlet duct,

said top cover member defining a condenser air discharge path having an opening in communication with the condenser air discharge opening at the top portion of the transport refrigeration unit,

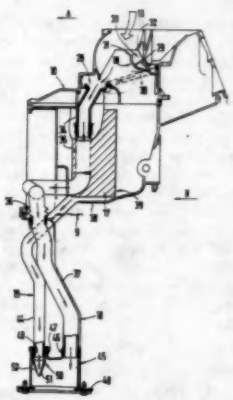
whereby air is drawn downwardly through the open upper end of the condenser air inlet duct, through the condenser, and is discharged upwardly through the opening defined by the top cover member.

4,956,979

HEATING AND/OR AIR-CONDITIONING SYSTEM FOR A MOTOR VEHICLE

Hermann Burst, Rutesheim; Klaus-Roger Düwel, Marbach; Ulrich Scheyhing, Winnenden; Walter Pross, Sindelfingen, and Horst Petri, Hemmingen, all of Fed. Rep. of Germany, assignors to Ing. h.c.F. Porsche AG, Fed. Rep. of Germany

Filed Jul. 31, 1989, Ser. No. 387,532
Claims priority, application Fed. Rep. of Germany, Jul. 30, 1988, 3826021
Int. Cl.[5] B60H *1/32*
U.S. Cl. 62—244 **13 Claims**



1. A heating and/or air-conditioning system for a motor vehicle having a housing containing an evaporator and a fan, having an inflow duct for fresh air, a first drain for the entering rain and washing water, and a second drain for the condensation water forming in the area of the evaporator, the fresh air, by way of an inlet opening arranged adjacent to a windshield, reaching the inflow duct, wherein at least portions of the two drains, at least in sections, are integrated, specifically separately from one another, into the housing of the heating and/or air-conditioning system.

4,956,980

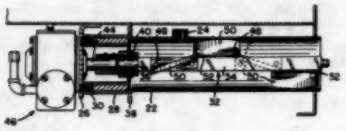
APPARATUS FOR PRODUCING SOFT SERVE DAIRY PRODUCTS, IN PARTICULAR YOGURT

Thomas A. Carvel, Ardsley, N.Y., assignor to Carvel Corporation, Yonkers, N.Y.

Filed Oct. 30, 1989, Ser. No. 429,303
Int. Cl.[5] A23G *9/16*
U.S. Cl. 62—342 **5 Claims**

1. An apparatus for producing soft-serve dairy products, especially yogurt, said apparatus comprising a housing; a freeze barrel mounted in said housing and including a front end, a rear end having a rear end wall, and an inlet spaced about one-fourth of the length of said freeze barrel from said

rear end wall and through which product mix is fed into said freeze barrel; a front plate assembly mounted over said front end of said freeze barrel for dispensing soft frozen product made in said freeze barrel; a beater shaft assembly supported in said freeze barrel for agitating and mixing the product mix and for propelling the product from said inlet to said front end of said freeze barrel; and a drive assembly for driving said beater shaft assembly, said beater shaft assembly including a shaft having a square cross-section and a longitudinal axis, four pairs of spaced pins projecting successively radially from four faces of said shaft, respectively, and extending along said shaft in a form of a spiral, and four blade elements supported on said four pairs of pins, respectively, with each blade element having a unidirectional spirally-curved longitudinal outer surface, said pairs of pins being arranged along said shaft with a first pin of a first pair of pins being spaced from said rear end wall about half-distance between said rear end wall and said inlet and with



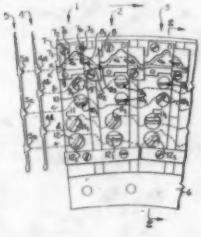
a first pin of third and fourth pairs of pins being spaced beyond a second pin of a preceding pair of pins in a direction of propelling of the product mix, each of said blade elements having a base and a fin projecting from said base and defining said unidirectional spirally-curved outer surface, said base having a substantially rectangular shape defining longitudinal and transverse edges of said base, and two spaced openings for engaging a respective pair of pins, said transverse edges being spaced from respective axes of said openings a distance substantially equal to a diameter of a pin, said fin having opposite outer edges that lie in planes that pass through respective end faces of said base and that extend slightly beyond respective longitudinal edges of said base so that when said four blade elements are mounted on said four pairs of pins, the unidirectional spirally-curved outer surfaces of the second and subsequent blade elements forming almost a perfect continuous spiral formation about said shaft.

4,956,981

CIRCULAR KNITTING MACHINE WITH MULTIPLE NUMBER OF FEEDS

Yukiari Iida, Hyogo, Japan, assignor to Precision Fukuhara Works, Ltd., Hyogo, Japan

Continuation-in-part of Ser. No. 180,055, Apr. 11, 1988, abandoned. This application Apr. 11, 1989, Ser. No. 336,094
Int. Cl.[5] D04B *9/38*
U.S. Cl. 66—20 **2 Claims**



1. In a circular knitting machine including a multiple number of feeds spaced around the machine, and selector means positioned immediately in advance of each of said feeds and being operable to selectively position dial and cylinder needles in one of four positions, knit, tuck, welt and early withdrawal positions at each of said feeds, the combination therewith of two types of knitting needles, each of said two types of needles including a master butt, a knit selector butt, and a tuck selector butt, stitch cams for engaging said master butt and drawing all of said needles to a stitch forming level immediately following each of said feeds, two tuck selector cams positioned in advance of the position where said needles are drawn to stitch forming level, said tuck selector cams being aligned to engage said tuck selector butts, two knit selector cams aligned to engage said knit selector butts, cylinders mounted for rotation and supporting said tuck and knit selector cams to selectively position the same in operative position, and wherein said knit selector cam cylinders are rotatable to the early withdrawal position to cause dial needles to be moved inwardly at an earlier than normal position to prevent interference with the feeding of yarn to the cylinder needles when forming blister type stitch constructions.

4,956,982

ANTI-THEFT DEVICE FOR GARMENTS

Jana Valley, 2301 Fairview Ave. E., #109, Seattle, Wash. 98102

Filed Feb. 9, 1990, Ser. No. 477,711
Int. Cl.[5] E05B *73/00*
U.S. Cl. 70—59 **3 Claims**

1. An anti-theft device for garments, comprising:
a flexible elongated member having opposite ends;
first and second rings secured to said opposite ends, respectively; said first ring having a first maximum diameter, and said second ring having a second maximum diameter smaller than said first maximum diameter; and
a pair of substantially semicircular jaws; each said jaw having first and second opposite ends and tapering in width from said first end to said second end, said second ends being permanently pivotably connected to each other, and said first ends having lock engaging portions; and said jaws being dimensioned to surroundingly receive an arm of a chair or a closet pole;
said first maximum diameter being sufficiently large to permit said first ring to slide over said first ends, and said second maximum diameter being sufficiently large to permit said second ring to slide over said second ends but sufficiently small to prevent said second ring from sliding over said first ends; and said second ring being slidably received onto said jaws; and
said device being foldable into a compact configuration to fit into a pocket of a garment.

4,956,983

LOCKING APPARATUS WITH A KEY

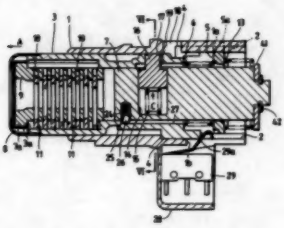
Naokatsu Okamura; Noboru Yamaguchi; Shuji Masuda, and Noboru Kanou, all of Aichi, Japan, assignors to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Aichi, Japan

Filed Sep. 8, 1989, Ser. No. 404,563

Claims priority, application Japan, Sep. 22, 1988, 63-124030[U]; Sep. 22, 1988, 63-124031[U]

Int. Cl.[5] E05B *65/19*

U.S. Cl. 70—241 10 Claims



1. A locking apparatus with a key, comprising:

a cylindrical body having an axis;

a cylindrical operation member mounted inside said body, said operation member being movable along said axis of said body;

a first spring for producing an elastic force to return said operation member to an original position;

a key rotor mounted inside said operation member, said key rotor being rotatable with respect to said operation member using said key, said key rotor being movable together with said operation member along said axis with respect to said body;

a second spring for producing an elastic force to urge said key rotor to rotate to an original position;

a limiting member provided in said key rotor;

a third spring for urging said limiting member to project outwardly from said key rotor;

an engagement portion disposed in said body, said engagement portion being engaged with said limiting member projected outwardly by said third spring when said operation member is pushed inwardly by a predetermined stroke along said axis against said first spring by a manual operation; and

a disengagement portion provided in said body, said disengagement portion unlocking said limiting member from said engagement portion, thereby returning said operation member and said key rotor to said respective original positions under said elastic forces of said first and second springs, in response to rotation of said key rotor.

4,956,984

LOCKING DEVICE

Lo Chi-Cheng, 8, Alley 158, Sec. 4, Nanking East Rd., Taipei, Taiwan

Filed Dec. 6, 1988, Ser. No. 280,389

Int. Cl.[5] E05B *47/00*

U.S. Cl. 70—277 6 Claims

1. A door locking device comprising:

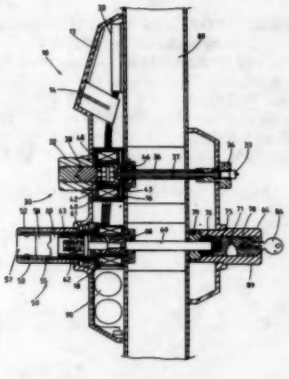
a card reader (14) adapted to receive a magnetic card to generate a first control signal; a first magnetic coil (16) operable by the first signal;

a push button keyboard (12) operable to generate a second control signal;

a second magnetic coil (18) operable by the second control signal;

a first rotary latch bolt (36), an external manual operating member (32), a first disengageable clutch means (40,43) operated by said first magnetic coil for transmitting a rotary drive force from said external operating member to one end of said first latch bolt, and an internal manual operating member (34) drivably connected to the other end of said first latch bolt independent of said external operating member;

a second rotary latch bolt (69), an external handle (52), a second disengageable clutch means (60, 61) operated by said second magnetic coil for transmitting a drive from



said external handle to one end of said second latch bolt, key-operated means (58) in said external handle for operating said second clutch means independently of said second coil, and internal handle (88), and a second key-operated means (78,71) within said internal handle for transmitting a drive force from said internal handle to the other end of said second latch bolt.

4,956,985

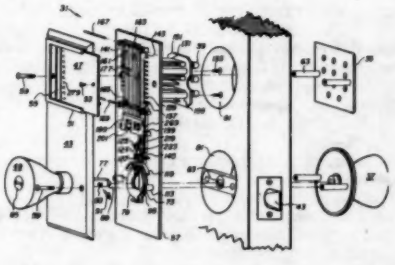
COMBINATION LOCK MECHANISM AND METHOD

Sung B. Kim, 4418 Pickett Rd., Fairfax, Va. 22032

Filed Apr. 28, 1989, Ser. No. 344,802

Int. Cl.[5] E05B *37/00*

U.S. Cl. 70—313 6 Claims



1. A combination locking apparatus, comprising:

combination slide means for designating a selected combination digit;

combination bar means associated with each of said combination slide means for slidably mounting said combination slide means thereon at selected intervals;

push button means for selectively actuating a combination digit;

push bar means associated with each of said push button means for transmitting the actuating motion of said push button means to said combination slide means, and succes-

sively incrementing each of said combination slide means and combination bar means to a translated first position;

common panel means for engaging and maintaining each of said combination bar means in said first position as successively correct combination digits are selected, said common panel means engaging successively deeper notches in each of said combination bar means to maintain said bars in said first position.

4,956,986

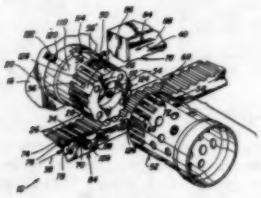
ROLL FORMING NOTCHES IN A THIN-WALL POWER TRANSMISSION MEMBER

Carl Anderson, Mt. Clemens, Mich., assignor to Anderson-Cook, Inc., Fraser, Mich.

Division of Ser. No. 302,374, Jan. 27, 1989, Pat. No. 4,891,962, which is a division of Ser. No. 263,396, Oct. 27, 1988, Pat. No. 4,882,926, which is a division of Ser. No. 88,696, Aug. 21, 1987, Pat. No. 4,819,468. This application Sep. 13, 1989, Ser. No. 406,455

Int. Cl.[5] **B21H** *5/00*; **B21D** *28/30*

U.S. Cl. 72—71 **5 Claims**



1. A method for forming notches (72) in a thin-walled annular sleeve portion (58) of a power transmission member (52), said method comprising: rotating the sleeve member (52) mounted on a mandrel (50) between two dies (84) having teeth (36) and roll punching projections (70) extending from the dies (84) to simultaneously form splines (68) in the sleeve member (52) while punching notches (72) through the sleeve member in at least some of the splines (68') as the sleeve member (52) is rotated on the mandrel (50) between the two dies (84).

4,956,987

ROTARY CUTTER FOR CUTTING A CONTINUOUS CORRUGATED STRIP

Yoshihiro Hara, Nagoya, and Takatoshi Iwase, Anjo, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Jul. 25, 1989, Ser. No. 384,483

Claims priority, application Japan, Jul. 27, 1988, 63-187168

Int. Cl.[5] **B21D** *13/04*

U.S. Cl. 72—185 **6 Claims**

1. A rotary cutter for cutting a continuous corrugated strip comprising:

a frame fixed on a stationary plane;

a toothed counterwheel rotatably supported on the frame and having at least one radial slot extending in the axial direction of the counterwheel;

a rotating means for rotating the toothed counter wheel;

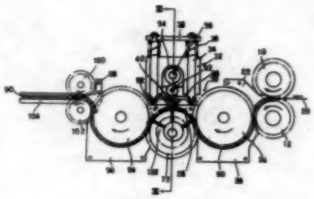
a first cutting blade having a first cutting edge at its outer end slidably received in the radial slot in such a manner that the first cutting blade reciprocates between a retracted position in which the first cutting edge substantially is restored in the radial slot and a projected position in which the first cutting edge is radially outwardly projected from the radial slot;

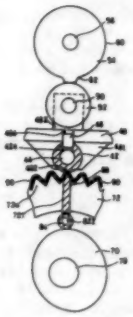
a first biasing means for biasing the first cutting edge toward the retracted position;

a second biasing means for biasing the first cutting edge toward the projected position;

a second cutting blade having a second cutting edge at its outer end confronting the first cutting edge, the second cutting blade being arranged in such a manner that the second cutting edge is engaged with the first cutting edge when the first cutting blade is in the projected position;

a third biasing means for biasing the second cutting blade toward a cutting position in which the first cutting edge shears the continuous corrugated strip in cooperation with the second cutting edge when the first cutting blade is at the projected position; and





at least one of the first cutting edge and the second cutting edge being inclined to a line which is perpendicular to an advancing direction of the continuous corrugated strip at a certain degree so that a cross point of the first cutting edge and the second cutting edge progresses from one side of the continuous corrugated strip to the other side of the continuous corrugated strip, the first cutting blade being positioned at the projected position and the second cutting blade being positioned at the cutting position until said cross point moves across the full width of the first and the second cutting edge.

4,956,988

MANDREL ROD FOR PIPE ROLLING MILLS

Francis Fischer, Sins; Jean-Paul Calmes, Grandvaux, and Alain Cron, Hildisrieden, all of Switzerland, assignors to Lonza Ltd., Gampel, Switzerland

Filed Aug. 22, 1989, Ser. No. 396,917

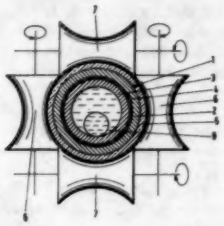
Claims priority, application Switzerland, Aug. 31, 1988, 03254/88

Int. Cl.[5] **B21B** *25/00, 25/04*

U.S. Cl. 72—208 **14 Claims**

1. Mandrel rod (1) for pipe rolling mills in which hollow billet (5) is rolled on mandrel rod (1), comprising a metallic outer pipe (2) and at least one metallic inner pipe (3) lying inside one another, said outer pipe (2) being separated radially from said at least one inner pipe (3) by a force transmission means consisting essentially of a non-metallic, solid-state mate-

rial (4) that transmits the rolling forces acting on said outer pipe (2) to said at least one inner pipe (3) so that said outer pipe



(2) is braced in a sandwich-like manner by said at least on inner pipe (3).

4,956,989

METHOD OF FORMING A COLLAR FOR HEATING EXCHANGER FIN AND DIE FOR USE THEREIN

Kazuto Nakajima, Yamatokouriyama, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Mar. 30, 1989, Ser. No. 334,886
Claims priority, application Japan, Mar. 31, 1988, 63-80819
Int. Cl.[5] B21D *28/14, 28/26*
U.S. Cl. 72—327 **5 Claims**

1. A method of forming a collar for heat exchanger fins, comprising:

providing a die set having a forming punch with a central axial punch-through hole therein, a free end with a rounded edge thereon and a guide portion having a plurality of successively larger outer diameter portions in succession from the free end, and a forming die in opposition to said forming punch and having a forming hole therein with an outer end and with a knockout collar slidable in said forming hole and a spring means urging said knockout collar toward the outer end of said forming hole and with a punch-through punch fixed in said knockout collar at a position spaced inwardly from the outer end of said forming hole and fittable into said punch-through hole in said forming punch for punching a hole in a sheet of material;

positioning a metal plate in which a collar is to be formed between said forming punch and said forming die and over said punch-through hole;

bringing said forming punch and said forming die together to move said forming punch into said forming hole and causing said knockout collar to yieldably engage said sheet material for first deforming the metal plate into said forming hole toward said punch-through punch for starting the formation of the collar;

continuing to move said forming punch and said forming die together to force said free end of said forming punch and said punch-through punch past each other for punching a hole in said deformed portion of said metal plate; and

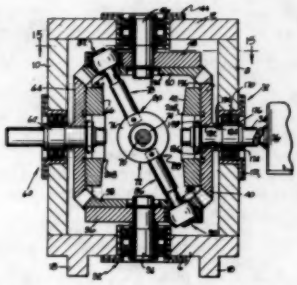
continuing to move said forming punch and said forming die together to move said successive larger diameter portions of said forming punch into said forming hole for forming the desired collar.

4,956,990

APPARATUS FOR FORMING CAN BODIES

Warren R. Williams, Fort Collins, Colo., assignor to Adolph Coors Company

Filed Sep. 5, 1989, Ser. No. 402,608
Int. Cl.[5] B21D *22/28*
U.S. Cl. 72—349 **20 Claims**



1. Apparatus for forming can blanks into elongated can bodies comprising:

support structure installed at a fixed location;

a first gear rotatably mounted on said support structure and having an axis of rotation;

a second gear rotatably mounted on said support structure and having an axis of rotation which is aligned with said axis of rotation of said first gear;

drive means for producing counter rotation between said first and second gears;

at least one can forming and ironing die means supported at a fixed location for use in forming can blanks into elongated can bodies;

at least one redraw assembly for positioning can blanks to be moved through said at least one can forming and ironing die means;

a ram mounted on said support structure for reciprocating linear sliding movement with portions thereof moving through said at least one redraw assembly and said at least one can forming and ironing die means to form a can blank into an elongated can body; and

connecting means for connecting said first and second gears to said ram so that rotation of said first and second gears reciprocates said ram in said linear directions.

4,956,991

VARIABLE DEPTH COLD WORKING TOOL

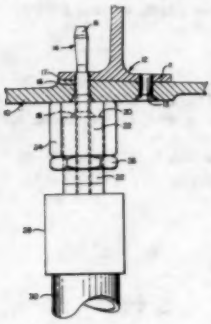
Denis E. Noonan, Hicksville, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Dec. 1, 1989, Ser. No. 445,570
Int. Cl.[5] B21J *13/02*; B23P *11/02*
U.S. Cl. 72—370 **5 Claims**

5. A method for cold working a preselected depth of a hole comprising the steps:

extending a micrometer anvil to a measured distance beyond

a reference plane equal to the hole depth to be cold worked;
inserting a mandrel into puller tool;
sliding a sleeve over the mandrel;
fixing the protrusion of the sleeve beyond the tool to equal the measured distance;



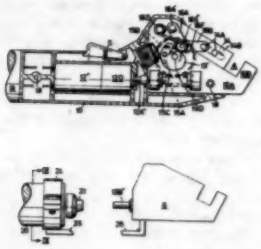
inserting the sleeve bearing mandrel into the hole so that the sleeve extends to the preselected depth;
pulling the mandrel outwardly thereby causing expansion of the sleeve to cold work the hole; and
removing the sleeve.

4,956,992

MANUAL TOOL DRIVABLE BY A ROTARY MOTOR

Hans Undin, Åkersberga, Sweden, assignor to C. A. Weidmuller GmbH & Co., Detmold, Fed. Rep. of Germany

Filed Oct. 10, 1989, Ser. No. 419,113
Claims priority, application Sweden, Oct. 17, 1988, 8803688
Int. Cl.[5] B21J *9/18*
U.S. Cl. 72—451 **20 Claims**



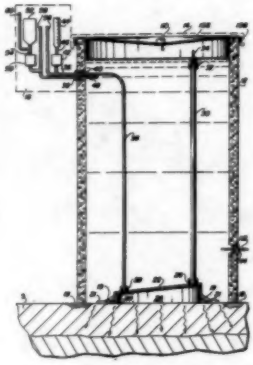
1. A hand tool, drivable by a rotary motor, for treating work pieces by pressure comprising:
a tool body having a recess adjacent one end thereof,
said recess having two sides and adapted to accommodate said work pieces, one of said two sides being disposed closer to said one tool body end and the other of said two sides being disposed farther away from said one tool body end,
an end support part of the tool body limiting said recess on the one side closer to said one tool body end,
a stamp member movable in a reciprocating motion toward and away from said end support part and limiting said recess on the other side farther away from said one tool body end,
said tool body having means defining a rectilinear path for slidably accommodating said stamp member, and
a motor driven force transforming mechanism for driving the stamp member in said reciprocation motion,
said motor driven force transforming mechanism comprising:
an input shaft drivable by the motor in rotary motion,
a cam disc rotatable about an axis parallel with said recess and drivably connected with said input shaft,
a toggle linkage comprising first and second lever arm elements,
said first lever arm element having a first end pivotally mounted in said tool body and a second end pivotally attached to said second lever arm element in a fulcrum point,
said second lever arm element having a first end pivotally attached to the second end of said first lever arm element in said fulcrum point and a second end attached to said stamp member so as to move it in said reciprocating motion, and
a roller defining a cam follower cooperating with said cam disc mounted in said fulcrum point.

4,956,993

SOIL INFILTROMETER

Marvin R. Mehler, Hutsonville, Ill., assignor to Marathon Oil Company, Findlay, Ohio

Filed Apr. 25, 1989, Ser. No. 343,101
Int. Cl.[5] G01N *15/08*
U.S. Cl. 73—38 **18 Claims**



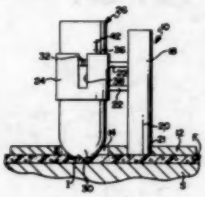
1. An infiltrometer useful for field testing soil permeability, comprising;
a large reservoir having an open bottom resting on the soil;
a small reservoir having an open bottom resting on the soil, the small reservoir being positioned within the large reservoir;
the small reservoir comprising a relatively large receptacle adjacent the soil and a relatively small receptacle connected thereto and extending upwardly therefrom;
the volume of the large reservoir greatly exceeding the volume of the small reservoir;
the ratio of the upper surface area of liquid in the large reservoir to the surface area of the soil covered thereby greatly exceeding the ratio of the upper surface area of liquid in the relatively small receptacle of the small reservoir to the surface area of the soil covered thereby; and
means for determining the amount of liquid from the small reservoir permeating into the soil.

4,956,994

METHOD AND APPARATUS FOR TESTING THE CURING CHARACTERISTICS OF PLASTICS

Ching-Tai Lue, Dover, N.H., assignor to Davidson Textron Inc., Dover, N.H.

Filed Apr. 10, 1989, Ser. No. 335,951
Int. Cl.[5] G01N 3/48
U.S. Cl. 73—81 6 Claims



1. A device for testing the curing characteristics of a test sample of curable thermosetting polymer material comprising:

a base adapted to be placed on a surface of said test sample of curable thermosetting polymer material during curing thereof; said base having an opening therethrough;

first support means affixed to said base and extending upwardly therefrom;

second support means including a guide sleeve affixed to said first support means and extending over said test sample and disposed at a predetermined distance therefrom;

a plunger slidably mounted within said guide sleeve, coacting means on said plunger and said guide sleeve for locating said plunger above said base opening and spaced from the surface of the test sample by supporting said plunger on said guide sleeve for subsequently positioning said plunger in non-impact contact with the surface of said test sample on which said base is supported to effect a finger contact pressure on the plastic material to form a first indentation in the surface of the test sample; said coacting means operable to reposition said plunger on said guide sleeve as said base is moved with respect to the surface of the test sample for aligning the plunger and said base opening with the test sample for subsequent non-impact contact with the surface of the test sample for producing a series of indentations in the surface of the test sample during a cure period.

5. A method for determining the curing characteristics of a test sample of a settable polymer material within a selected time period subsequent to the manufacture of said material from mixable components comprising the steps of:

providing a device for applying a non-impact load on a surface of a test sample made from said material including a guide sleeve, a plunger slidably supported in the guide sleeve and coacting means for supporting the plunger on the top of the guide sleeve and for hand releasing the plunger for movement against the upper surface of the test sample to emulate finger pressure thereon;

mixing said mixable components to form a test sample of uncured polymer material having an upper surface;

applying a given non-impact load to a first point on the upper surface of said test sample of uncured polymer material with the plunger to effect a first indentation in the upper surface of the material as it cures;

applying said given non-impact load to a second point on the upper surface of said polymer material by hand releasing the plunger to a second point on the upper surface at a selected time after said first indentation has been made to effect a second indentation in the upper surface of said material;

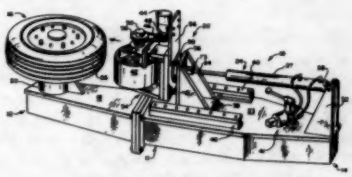
measuring and recording the depth of the second indentation, subsequently hand releasing the plunger for applying said given non-impact load to a series of other points on the upper surface of said polymer material each at a different selected time after said first indentation has been made to effect a series of other indentations in said material until the depth of said other indentations in said material until the depth of said other indentations is substantially constant to reflect the cure point of the material, and correlating the cure point of said material with the time elapsed from said mixing of uncured polymer to the production of indentations with the depths thereof of substantially constant value.

4,956,995

COMPACT RADIAL FORCE MEASURING APPARATUS FOR DETERMINING VARIATIONS IN RADIAL FORCE AROUND A TIRE AND RIM ASSEMBLY

David O. Harrold, and Charles F. Powell, both of Fort Wayne, Ind., assignors to Navistar International Transportation Corp., Chicago, Ill.

Filed Jan. 16, 1990, Ser. No. 465,687
Int. Cl.[5] G01M 17/02
U.S. Cl. 73—146 23 Claims



1. A compact radial force measuring apparatus for use in determining the radial force variation exhibited by a tire and rim assembly of a vehicle wheel comprising:

a base member;

a rim mounting flange rotatably mounted on said base member for rotation about a fixed axis, said flange being adapted to receive a tire and rim assembly;

rotatable drum means movably mounted on said base member for selective contact with the circumference of a tire and rim assembly mounted on said flange, said drum means having a diameter less than the diameter of said tire and rim assembly;

force applying means associated with said rotatable drum means for moving said rotatable drum means against said circumference of said tire and rim assembly, said force applying means being disposed to maintain a constant center-to-center distance between said tire and rim assembly and said rotatable drum means subsequent to the application of an initial predetermined force;

means for causing relative rotation between said rotatable drum means and said tire and rim assembly; and,

sensing means for measuring the force existing between said tire and rim assembly and said rotatable drum means at a plurality of points around the circumference of said tire and rim assembly.

4,956,996

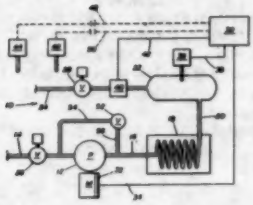
TANK GAUGING APPARATUS AND METHOD

Brian G. Morris, Houston, Tex., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Continuation of Ser. No. 217,725, Jul. 11, 1988, abandoned. This application Aug. 18, 1989, Ser. No. 396,726
Int. Cl.[5] G01F 17/00
U.S. Cl. 73—149 6 Claims

1. A method of gauging the amount of liquid in a container of liquid and gas in low or zero gravity net conditions, comprising the following steps:

a. providing a closed fluid system comprising an accumulator for receiving gas removed from said container, a compressor for pumping said gas from said container into the accumulator, and means for selectively connecting the compressor and accumulator to the container;
b. determining the pressure and temperature of fluid in the container and of gas in the accumulator;
c. pumping gas from the container into the accumulator;
d. determining the pressure and temperature of fluid in the container and of gas in the accumulator; and



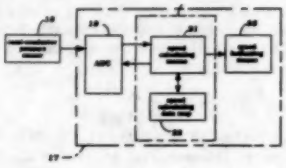
e. utilizing the pressure and temperature values to determine the volume of gas in the container, and determining the volume of liquid in the container from the difference between the volume of the container and the volume of the gas in the container, whereby the closed system precludes the need of an external gas source, and subsequent volume determinations are made after gas is transferred from the accumulator to the container.

4,956,997

VESSEL SPEED DETECTING DEVICE

Kazuhiro Nakamura; Tatsuya Yoshioka, both of Hamamatsu; Ryoji Sawada, and Tomoji Nakamura, both of Iwata , all of Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Oct. 14, 1988, Ser. No. 257,707
Claims priority, application Japan, Oct. 16, 1987, 62-259564
Int. Cl.[5] G01C *21/10*
U.S. Cl. 73—182 **4 Claims**



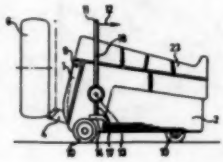
1. A speed indicator for a watercraft comprising a pressure transducer for experience dynamic water pressure created by the movement of said watercraft in a body of water, processing means for generating a speed indication signal from the output of said pressure transducer, display means for indicating watercraft speed in response to said speed indicator signal, and means for providing a modified speed indication in the event of an abrupt change in watercraft speed.

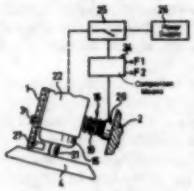
4,956,998

APPARATUS FOR DRIVING A MOTOR VEHICLE WHEEL FOR DETERMINING UNBALANCE THEREOF

Eickhart Goebel, Pfungstadt, Fed. Rep. of Germany, assignor to Hofmann Werkstatt-Technik GmbH, Pfungstadt, Fed. Rep. of Germany

Filed Aug. 2, 1989, Ser. No. 388,002
Claims priority, application Fed. Rep. of Germany, Aug. 24, 1988, 3828724
Int. Cl.[5] G01M *1/28*
U.S. Cl. 73—457 **12 Claims**





1. Apparatus for driving a motor vehicle wheel while it is fitted to the motor vehicle for the purposes of determining unbalance thereof, comprising a drive motor; a friction wheel adapted to be driven by the drive motor; means for pressing the friction wheel against the motor vehicle wheel for driving same at a speed of rotation required for an unbalance measuring operation; and means for switching the drive motor on and off in dependence on the pressure force with which the friction wheel is adapted to be pressed against the motor vehicle wheel, the pressure force being of such a magnitude as to provide for substantially slip-free transmission of torque between the friction wheel and the motor vehicle wheel both when the drive motor is switched on and when it is switched off.

4,956,999

METHODS AND APPARATUS FOR MONITORING STRUCTURAL MEMBERS SUBJECT TO TRANSIENT LOADS

William L. Bohannan, Gales Ferry; Harrington, J. Vincent, Groton, both of Conn., and John K. Pfister, Mt. Airy, Md., assignors to GP Taurio, Inc., Columbia, Md.

Division of Ser. No. 278,196, Nov. 30, 1988, Pat. No. 4,901,575.
This application Oct. 27, 1989, Ser. No. 428,503
Int. Cl.[5] G01D *21/00*
U.S. Cl. 73—587 **32 Claims**

1. A method of central station monitoring a plurality of structural members remote from the central station for detecting changes in the structural integrity of any of the plurality of structural members, comprising:

providing each remote structural member with a linear motion sensor for detecting the sonic and infrasonic frequencies transmitted by the structural member along a first linear dimension in response to a transient load applied to the structural member, such frequencies including the natural fundamental and harmonic frequencies of the structural member in response to the transient load, said

linear motion sensor providing a signal corresponding to the detected frequencies in said first linear dimension; and,

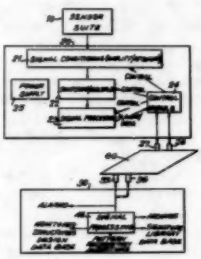
separately for each of the plurality of structural members,

subjecting the structural member to a first transient load;

detecting a first signal corresponding to the frequencies transmitted by the structural member along a first linear dimension in response to the first transient load;

determining from the first signal a first structural acoustic signature including the detected fundamental and harmonic frequencies subsequent to the first transient load; and thereafter

detecting a second signal corresponding to the frequencies transmitted by the structural member along the first linear dimension in response to a subsequent transient load;



determining from the second signal a second structural acoustic signature including the detected fundamental and harmonic frequencies subsequent to the subsequent transient load;

comparing the second signature and the first signature to determine whether there has been a change in the detected fundamental or harmonic frequencies subsequent to the transient load from the first signature to the second signature that is greater than a predetermined amount, whereby said change corresponds to a change in structural integrity; and

providing information to the central station identifying which of the plurality of structural members have undergone a determined change in structural integrity.

4,957,000

APPARATUS FOR OBTAINING INFORMATION ON THE INTERIOR OF AN OBJECT

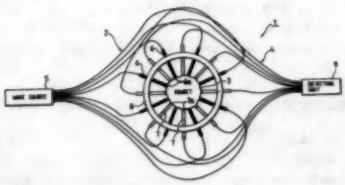
David T. Delpy; Hideo Hiruma, and Susumu Suzuki, all of Shizuoka, Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan

Filed Jan. 18, 1989, Ser. No. 298,138

Claims priority, application Japan, Jan. 19, 1988, 63-009007

Int. Cl.[5] G01N *29/00*

U.S. Cl. 73—622 **7 Claims**



1. An apparatus for obtaining information on the interior of an object, said apparatus comprising:

irradiating means for applying an electromagnetic wave to an object being measured;

detecting means for detecting the electromagnetic wave passed through and scattered inside the object, said detecting means comprising a plurality of detecting elements for receiving the electromagnetic wave from the object;

holding means for supporting said irradiating means and said detecting means in such a manner that said irradiating means and said detecting means are slidable; and

position detecting means for detecting the position of said irradiating means and said detecting means with respect to said holding means.

4,957,001

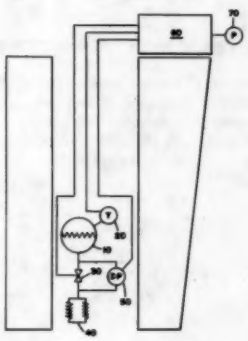
APPARATUS AND METHOD FOR MEASURING RESERVOIR PRESSURE CHANGES

John M. Powell, Yorba Linda, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Jun. 29, 1989, Ser. No. 374,192

Int. Cl.[5] G01L *13/02*

U.S. Cl. 73—716 **6 Claims**



1. An apparatus for the accurate measurement of pressure changes comprising:

(a) a reference accumulator that stores a reference pressure representative of the environment being measured,

(b) a differential pressure transducer connected to said reference accumulator, wherein said differential pressure transducer measures the difference between the reference pressure and the pressure of the environment being measured,

(c) a valve connected to said reference accumulator that allows the reference accumulator to be charged to a pressure representative of the environment being measured and provides protection to said differential pressure transducer from overpressuring, and

(d) an isolation bellows, connected to said valve, for protecting said apparatus from the environment being measured.

4,957,002

METHOD, SYSTEM AND DEVICE FOR DETERMINING QUALITY OF ASSEMBLY OF TOOL PARTS

William E. Coyle, Jr., Houma, and Dennis J. Pennison, Raceland, both of La., assignors to Bilco Tools, Inc., Houma, La.

Filed Feb. 27, 1989, Ser. No. 315,830

Int. Cl.[5] G01B *7/16*

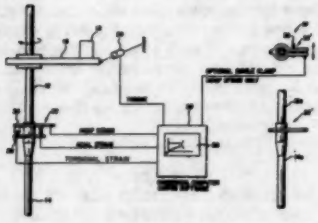
U.S. Cl. 73—761 **49 Claims**

1. A method for determining the quality of assembly of tool parts, wherein a first tool part is assembled with a second tool part by rotatably inserting the first tool part into the second tool part to form a tool joint, the method comprising the steps of:

(a) measuring at least one of the rates of rotation of the first

and second tool parts and the torque imposed on the first and second tool parts to obtain a first set of data;

(b) measuring at least two of axial strain, torsional strain and



hoop strain imposed on the tool joint to obtain a second set of data; and

(c) processing the first and second sets of data to determine the quality of assembly of the tool parts.

4,957,003

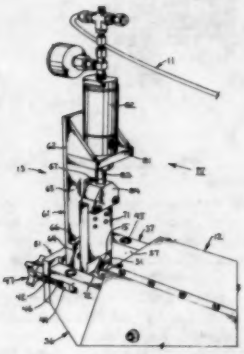
SLOW STRAIN RATE SHEAR STRENGTH TESTER FOR COMPACT

Everett N. Hiestand, Galesburg; Stephen Balog, Kalamazoo, and David D. Gleason, Oshtemo, all of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Sep. 8, 1989, Ser. No. 405,459

Int. Cl.[5] G01N *3/40*

U.S. Cl. 73—818 **7 Claims**



1. A slow strain rate compression tester for measuring a physical characteristic of a large blocklike tablet of compressed particulate material, such as for pharmaceutical applications, said tester comprising: a pressing arrangement including a housing having a generally vertical end wall, a drive motor, and a ram assembly coupled to and driven by said drive motor for linear reciprocating movement relative to said housing along a substantially horizontal movement axis, said ram assembly including a linearly reciprocal ram member which is elongate along said horizontal movement axis and which slidably projects outwardly beyond the end wall of said housing, said ram member having a tablet compression element mounted on a free outer end thereof;

first and second support bracket means fixedly mounted on the end wall of said housing and projecting outwardly therefrom in generally cantilevered relation, said first and second bracket means being sidewardly spaced apart and defining a vertically open region therebetween, said ram member being positioned centrally within said region with said first and second bracket means being disposed substantially equally horizontally spaced from said ram member on opposite sides thereof;

each of said bracket means defining thereon an upper inner side surface and a lower inner side surface which are sidewardly spaced apart and are joined together by a generally upwardly facing and substantially horizontally extending steplike surface, the upper inner side surfaces on said first and second bracket means being disposed in directly opposed and parallel relationship, the lower inner side surfaces of said first and second bracket means being disposed in directly opposed and parallel relationship, the transverse horizontal spacing between the opposed lower side surfaces being less than the transverse horizontal spacing between the opposed upper side surfaces;

said first and second bracket means defining thereon outer end surfaces which are sidewardly spaced apart and which are disposed within a generally common vertical plane;

manually-operable clamping means mounted on each of said bracket means and including an elongate member which is coupled to the respective bracket means and which projects outwardly a significant extent beyond the end surface and which mounts thereon a manually movable clamping member; and

a tablet-supporting head assembly removably mounted on said first and second support bracket means and fixedly secured to said bracket means by said clamping means;

said head assembly including a generally vertically oriented mounting plate extending horizontally between said first and second bracket means and having opposite vertically-extending edge portions which overlap and abut the end surfaces of said first and second bracket means, the edge portions having openings extending therethrough for accommodating the elongate members of the clamping means to permit the mounting plate to be rigidly and fixedly clamped to the end surfaces of the first and second bracket means to close off the outer end of said open region whereby said mounting plate is spaced horizontally outwardly from the end wall of said housing, said mounting plate having guide means fixedly and integrally associated therewith and projecting inwardly therefrom for slidable and abutting engagement with the opposed upper inner surfaces and the steplike surfaces defined on said first and second bracket means;

said head assembly also including tablet support means mounted to said mounting plate and projecting inwardly therefrom into the region between said first and second bracket means, said tablet support means having a pair of tablet engaging members for supporting a tablet so that parallel side faces of the tablet are vertically oriented with one said side face abutting a flat support surface defined on the tablet support means, the other side face being disposed substantially in opposed relation to the tablet compression element and substantially aligned with the horizontal motion axis so as to be contacted by the tablet compression element during extension of the ram member.

4,957,004

TESTING APPARATUS

Peter R. McKinlay, and Christos Tseglakoff, both of Victoria, Australia, assignors to Amcor Limited, S. Melbourne, Australia

Filed Jun. 19, 1989, Ser. No. 367,803

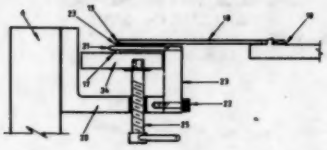
Claims priority, application Australia, Jun. 23, 1988, PI8941

Int. Cl.[5] G01N *3/24*

U.S. Cl. 73—842 **4 Claims**

1. In corrugated paperboard which comprises a corrugated medium with flutes held between a first liner and a second liner, a system for testing the strength of the adhesive bond between said corrugated medium and one first liner, comprising a load measuring device and a load applying device, gripping means connected to said load measuring device for clamp-

ing said medium of a sample of said corrugated paperboard, said gripping means comprising a plate and a plurality of prongs adapted to lie within the flutes of the corrugated me-



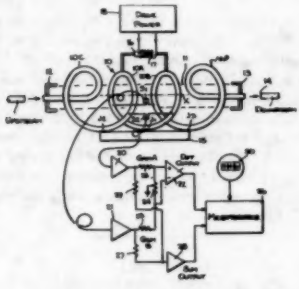
dium, said sample having been prepared by bonding a rigid strip to the surface of said first liner, said load applying device applying force to said strip bonded to the first liner in a plane parallel to said adhesive bond.

4,957,005

CORIOLIS-TYPE FLOWMETER

John Yard, Doylestown, and Warren O. Strohmeier, Warminster, both of Pa., assignors to Fischer & Porter Company, Warminster, Pa.

Filed Oct. 5, 1989, Ser. No. 417,692
Int. Cl.[5] G01F *1/84*
U.S. Cl. 73—861.38 **11 Claims**



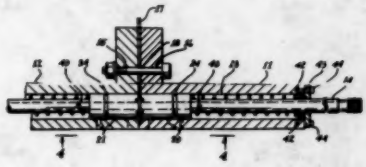
1. A mass flowmeter of the Coriolis-type comprising:
(a) a flow tube helically coiled to define a helix having a pair of adjacent identical measuring loops forming a double loop, on either side of which is an isolation loop;
(b) a support structure coaxial with the helix having at one end a flow inlet to which is affixed an input to one of said isolation loops to which a fluid to be metered is admitted, and having at its other end a flow outlet to which is affixed an output from the other isolation loop from which the fluid is discharged;
(c) a rigid bar joined to the junction of the measuring loops as well as to the respective junctions of each measuring loop and its associated isolation loop whereby the isolation loops then behave as decoupling springs to effectively isolate the bar and the double loop from external forces;
(d) means to excite the measuring loops to cause them to vibrate in phase opposition as the tines of a tuning fork, the fluid passing through these loops being subjected to Coriolis forces causing the vibrating loops to torsionally oscillate; and
(e) means to sense the torsional oscillations to produce signals indicative of the mass flow of the signal.

4,957,006

MULTIPLE ORIFICE FLOW MEASURING DEVICE

James B. Harter, 1502 W. Broadway, Phoenix, Ariz. 85041

Filed Nov. 27, 1989, Ser. No. 441,766
Int. Cl.[5] G01F *1/42*
U.S. Cl. 73—861.62 **15 Claims**



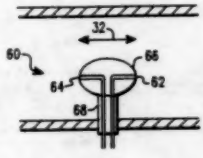
1. A multiple orifice flow measuring device comprising:
a. a housing having a central passage and a shaft passage located above and parallel to the central passage;
b. a pipe located in the central passage, the pipe adapted to be connected to a gas flow line;
c. a shaft mounted in the shaft passage;
d. a disk rotatably mounted on the shaft and having a plurality of orifices of various diameters spaced circumferentially about the disk and selectively registerable in the flow passage of the pipe;
e. a piston movably positioned around the pipe in the central passage and positioned against the disk, the piston having a annular recess; and
f. a spring located in the central passage between the piston and the end of the housing opposite the disk so that the spring forces the piston against the disk, thereby maintaining it in position;
g. means for applying force to compress said spring and move said piston away from said disk, said force means extending from outside the housing into the piston annular recess.

4,957,007

BI-DIRECTIONAL PRESSURE SENSING PROBE

Lewis Gray, Winter Springs, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 187,137, Apr. 28, 1988, abandoned. This application Apr. 12, 1989, Ser. No. 337,075
Int. Cl.[5] G01F *1/46*
U.S. Cl. 73—861.65 **4 Claims**



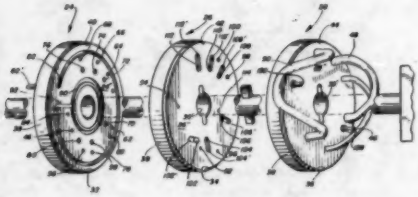
1. A bi-directional pressure sensing probe sensing fluid flow, comprising:
a first orifice facing into the flow;
a second orifice facing away from the flow; and
a probe body comprising:
differential means for maximizing a pressure differential between said first and second orifices and comprising said probe body having an ellipsoidal shape; and
positioning means for positioning said first and second orifices in a laminar region of the flow, said positioning means comprising:
first and second streamlined stems; and
first and second pressure sensing tubes attached to and suspending said body away from said stems.

4,957,008

FLUID SAMPLING AND TRANSFER VALVE ASSEMBLY

Oscar Proni; Ervin Fayer, both of Hollywood, and George G. Dominick, Miramar, all of Fla., assignors to Coulter Electronics, Inc., Hialeah, Fla.

Filed Dec. 28, 1988, Ser. No. 290,963
Int. Cl.[5] G01N 1/10
U.S. Cl. 73—864.83 12 Claims



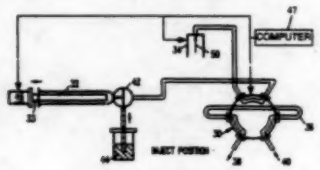
1. A liquid sampling, metering and transfer valve assembly for use in diluting apparatus of the type employed in a particle study system, the valve assembly being capable of providing plural precise liquid sample volumes from a single liquid source, said valve assembly including internal segmenting passageways for measuring, isolating and storing precise liquid sample aliquots therein, means for delivering each aliquot to different locations exterior of said valve assembly along with respective precise volumes of liquid diluent as individual dilutions, each dilution being of predetermined concentrations and loop means integral with said valve assembly for measuring, isolating and storing each of said precise volumes of liquid diluent as individual volumes for delivery to each respective one of said aliquots as said individual dilutions.

4,957,009

PUSHLOOP LIQUID SAMPLING METHOD

Andre Nohl, Sunnyvale, and Landy B. White, Sunol, both of Calif., assignors to Spectra-Physics, Inc., San Jose, Calif.

Continuation of Ser. No. 248,832, Sep. 23, 1988, abandoned. This application Jan. 11, 1990, Ser. No. 467,299
Int. Cl.[5] G01N 1/14
U.S. Cl. 73—864.84 13 Claims



1. A method of transferring a liquid sample from a reservoir to an analytical column by means of a valve having a body and having at least two position comprising the steps of:

drawing the sample from the reservoir through a needle;

passing the sample from the needle through the valve in a first direction with the valve in a first position;

switching the valve to a second position;

passing only a portion of the sample into the valve in a second direction; and

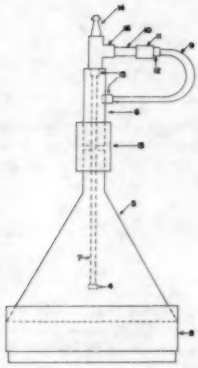
then injecting the portion of sample into the column; wherein at all times the needle is stationary relative to the body of the valve.

4,957,010

METHOD AND APPARATUS FOR DETERMINING PARTICLE SIZE DISTRIBUTION

Paul C. Cirignano, Braintree, Mass., assignor to W. R. Grace & Co.-Conn., Lexington, Mass.

Filed Jul. 25, 1989, Ser. No. 384,942
Int. Cl.[5] G01N 15/02
U.S. Cl. 73—865.5 7 Claims



1. Apparatus for determining the particle size distribution of lightweight polymer material, said apparatus comprising chamber means for initially containing said material, said chamber means being in communication with chamber gas supply means so as to create in said chamber means a downward draft; material agitation means disposed in said chamber means for agitating said material, said material agitation means comprising a flexible tube in communication with material agitation gas supply means, said gas supply means supplying gas to said tube so as to cause said tube to move randomly in said chamber and agitate said material; filtering means in communication with said chamber means for classifying said material according to size; and receptacle means in communication with said filtering means for receiving gas and material passing through said filtering means.

4,957,011

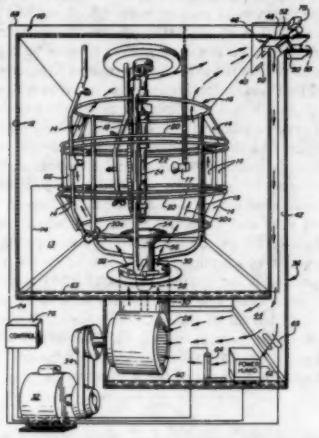
WEATHERING TESTING SYSTEM

James V. Huber, Oak Park; Kurt P. Scott, Chicago, and Rudolph J. Leber, Palatine, all of Ill., assignors to Atlas Electric Devices Co., Chicago, Ill.

Continuation of Ser. No. 131,221, Dec. 10, 1987, Pat. No. 4,843,893.
This application May 1, 1989, Ser. No. 345,658
The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.
Int. Cl.[5] G01N 25/00
U.S. Cl. 73—865.6 13 Claims

1. In a weathering testing system which comprises rack means for carrying samples to be tested, means for irradiating the inner-facing surfaces of said samples carried on said rack, and blower means for directing a stream of air through said rack, the improvement comprising, in combination: said system carrying temperature sensing means comprising a first temperature sensor positioned to be irradiated by said irradiating means and a second temperature sensor positioned to be less influenced by radiation from said irradiating means than said first temperature sensor, said temperature sensors being positioned in said stream of air, said first temperature sensor being in electrical connection with first automatic control means for the air flow, said first automatic control means being operably connected to said blower means, whereby the output of said

blower means, is selectively adjusted responsive to the temperature sensed at said first sensor, the second temperature sensor



being in electrical connection with second automatic control means for regulating a fresh air supply.

4,957,012

PREDICTIVE AGING OF POLYMERS

Edward F. Cuddihy, Tujunga, and Paul B. Willis, La Canada, both of, assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jun. 16, 1989, Ser. No. 366,957
Int. Cl.[5] G01N *21/00, 25/00*
U.S. Cl. 73—866 **20 Claims**

1. A method of predicting the aging of polymers exposed to solar radiation in the outdoors comprising the steps of:

(a) Placing a specimen of a polymers to be tested on a heatable platen assembly;

(b) Disposing the platen assembly in an outdoor environment during periods of sunlight alternating with periods of dark such that the polymer specimen is exposed to and receives solar radiation from the sun during periods of sunlight;

(c) Periodically heating the platen assembly only during said periods of sunlight to a constant temperature from between 30° C. up to 20° C. below the melting temperature of the polymer being tested to periodically heat the polymer specimen while it is exposed to sunlight;

(d) Measuring a physical property of the polymer specimen over an induction period from the initial disposition of the polymer specimen outdoors until a sudden change in said physical property; and

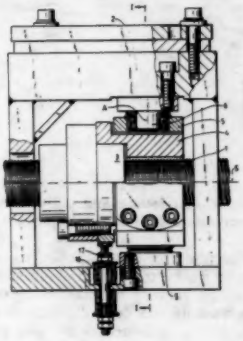
(e) recording said induction period.

4,957,013

SPINDLE DRIVE FOR A COORDINATE MEASURING MACHINE

Heinz Broghammer, Zimmern, and Gerhard Band, Oberndorf, both of Fed. Rep. of Germany, assignors to Mauser-Werke Oberndorf GmbH, Fed. Rep. of Germany

Filed Aug. 15, 1989, Ser. No. 393,995
Claims priority, application Fed. Rep. of Germany, Sep. 8, 1988, 3830526
Int. Cl.[5] F16H *25/24*
U.S. Cl. 74—89.15 **5 Claims**



1. A spindle drive for a coordinate measuring machine; comprising a driven threaded spindle having an axis, a spindle nut being seated on said spindle and fastened in a receiving member; a retaining component connected with said driven threaded spindle through a plurality of compensating means so as to facilitate a radial compensating play relative to the spindle axis and a compensating of wobbling movements of the spindle between said receiving member and retaining component; a spacer ring intermediate said receiving member and said retaining component; said compensating means connecting said spacer ring with said receiving member to facilitate a compensating play in a first perpendicular direction relative to the spindle axis; second compensating means connecting said spacer ring with the retaining component to facilitate a compensating play in a second direction perpendicular to the spindle axis and to the first perpendicular direction, and said first and second compensating means each include at least one cylindrical carrier trunnion; a ball bearing ring for guiding each trunnion in, respectively, said first or second direction and free from play along the direction of the spindle axis, the axes of the carrier trunnions and the ball bearing rings extending in, respectively, the first and second direction and intersecting the spindle axis at a common point.

4,957,014

CABLE DRIVE GEOMETRY

Edward F. Burke, Lake Oswego, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Apr. 10, 1989, Ser. No. 335,359
Int. Cl.[5] F16H *19/06*
U.S. Cl. 74—89.22 **9 Claims**

1. Fixed length cable drive apparatus for moving a mass along a predetermined mass path comprising:

guide means comparable to a mass for maintaining the mass on the mass path during movement;

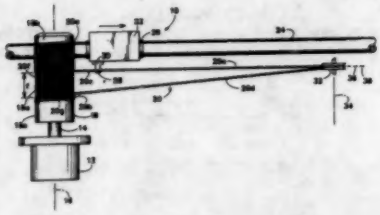
fixed length cable means comprising first and second cable portions, with each portion having two ends, one end of each cable portion being attached to the guide means;

first and second reel means rotatable about respective axes of rotation and being attached to the other end of a respec-

tive one of the first and second cable portion during movement of the mass along the path;

pulley means fixed relative to the reel means for carrying one of the cable portions; and

drive means for rotating the first and second reel means about the respective axes of rotation, and thereby moving a mass coupled to the guide means along the mass path;



said cable means, reel means, and pulley means being arranged to provide a desired tensile preload in said cable means; and

the first and second reel means, pulley means and guide means defining a cable travel path of substantially uniform length for all positions of the mass along the mass path, thereby maintaining the desired tensile preload in said cable means during movement of the mass along the mass path.

4,957,015

HOLDING MEANS AND BINDING MEANS FOR SELECTOR GEAR SERVO VALVE IN A HYDRAULIC TRANSMISSION

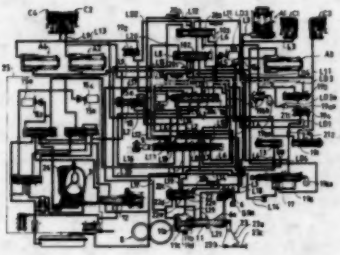
Kelichi Ishikawa, Utsunomiya, and Shoji Asatsuke, Takanezawa, both of Japan, assignors to Honda Giken Kogyo Kabushikki Kaisha, Tokyo, Japan

Filed Sep. 14, 1988, Ser. No. 244,224

Claims priority, application Japan, Sep. 17, 1987, 62-230999; Sep. 17, 1987, 62-231000

Int. Cl.[5] B60K *20/14, 41/10*

U.S. Cl. 74—335 **6 Claims**



1. A control apparatus for a hydraulically operated vehicular transmission comprising a plurality of forward transmission trains which are established respectively by individual hydraulic clutches; a reverse transmission train which shares for common use a hydraulic clutch with a predetermined first one of the forward transmission trains; a selector device sleeve which is switchable to a forward side in which said predetermined first forward transmission train is established and to a reverse side in which said reverse transmission train is established; and a hydraulic circuit including a manual valve for switching over the transmission between a forward position, a reverse position, a neutral position and a parking position, a servo valve for forward/reverse switchover connected to the selector device sleeve so that, when the manual valve provided in said hydraulic circuit is operated for switchover to a reverse position, the servo valve may be puahed by hydraulic pressure to a reverse location at which the selector device sleeve is set to the reverse side and at the same time oil may be supplied to the hydraulic clutch for said predetermined first transmission train, a holding means for holding the servo valve in the reverse location so that, when the manual valve is switched over from the reverse position to the neutral or parking position, the servo valve may be held in the reverse location and, when the manual valve is switched over to the forward position, the servo valve may be pushed by the hydraulic pressure to the forward location at which the selector device sleeve is set to the forward side, and a binding means for, when the manual valve is operated for switchover to the forward position, binding the servo valve to remain in the reverse location by shutting out inputting of the hydraulic pressure into the servo valve until a hydraulic clutch for a second transmission train attains a predetermined level of the hydraulic pressure, said second transmission train being, among the forward transmission trains, the very one to which supplying of the oil is started right with said switchover of the manual valve.

4,957,016

VEHICLE TRANSMISSION, PARTICULARLY FOR AN AGRICULTURAL TRACTOR

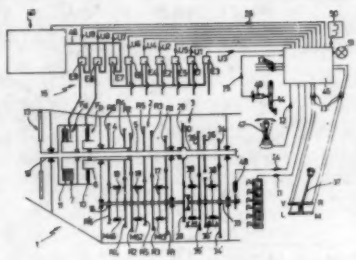
Giuseppe Amedei, Modena, and Angelo Rondelli, Cento, both of Italy, assignors to Fiatgeotech - Technologie Per La Terra S.p.A, Modena, Italy

Continuation of Ser. No. 359,211, May 31, 1989, abandoned. This application Mar. 22, 1990, Ser. No. 497,832

Claims priority, application Italy, May 31, 1988, 67501 A/88

Int. Cl.[5] B60K *20/14, 20/16*

U.S. Cl. 74—336 R **11 Claims**



1. A vehicle transmission, particularly for an agricultural tractor, comprising an input shaft at least a first stage having two drive shafts selectively connectable to said input shaft via respective first hydraulic clutch means, an output shaft angularly connectable to each said drive shaft via a number of transmission ratios defined by respective constant mesh gears, and second selective clutch means for each pair of adjacent said gears, operated by respective three-position hydraulic actuators; and control means for controlling said first clutch means and said hydraulic actuators; characterised by the fact that said control means comprise two on-off solenoid valves (E1, E3, E5, E2; E4, E6) for each said hydraulic actuator (A13, A52, A46), each designed to control engagement of a respective transmission ratio; two proportional-response solenoid valves (E8, E9) for engaging and releasing respective said first clutch means (Fp, Fd) on said drive shafts (4, 5); at least a third proportional-response solenoid valve (E7) for regulating supply pressure to said on-off solenoid valves (E1,. . .,E6); and a control unit (45) designed to control said solenoid valves (E1, . . . ,E9) in such a manner as to engage and release said first and

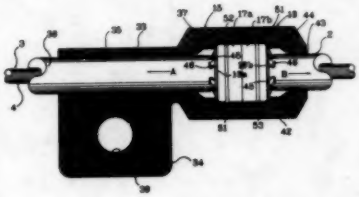
second clutch means (Fp, Fd; M13, M52, M46) according to predetermined laws depending on the service condition of said vehicle.

4,957,017

ASSEMBLY AND METHOD FOR THE ADJUSTMENT OF A CABLE CASING

Christopher H. Corbett, Bolivar, Ohio, assignor to Flex Technologies, Inc., Midvale, Ohio

Filed Apr. 12, 1989, Ser. No. 336,738
Int. Cl.[5] F16C *1/10*
U.S. Cl. 74—502.4 **10 Claims**



1. An improved assembly for the adjustment of a casing of the type having a cable slideably mounted therein, wherein said cable extends between and operatively connects a pair of movable members, said assembly including, first and second mounting means for attaching the casing at spaced locations generally adjacent to the movable members, said first mounting means movably mounting a first end of the casing, and said second mounting means immovably mounting a second end of the casing; gripping means including a plurality of tangs spaced circumferentially about and gripping the casing mounted in the first mounting means for permitting movement of the movable first end of the casing in a first direction and for restraining movement of said casing in a second direction opposite to said first direction, so that upon movement of one of the movable members in a predetermined direction the movable first end of the casing moves in the first direction to remote slack from the casing, and is retained in an adjusted position and restrained from moving in the second direction by the gangs of the gripping means; lock means movably mounted on the casing adjacent to and spaced from the first mounting means for restraining post-adjustment movement of said casing in the first direction, so that upon manual movement of the lock means into abutment with the first mounting means after movement of the casing to the adjusted position, said casing subsequently is restrained from additional movement in the first direction.

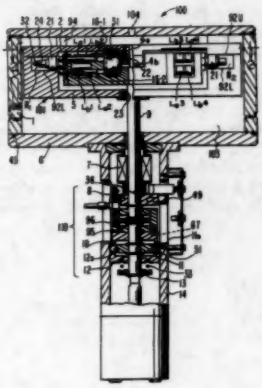
4,957,018

MECHANISM FOR SELECTIVELY LOCKING AND UNLOCKING A TRANSLATABLE SHAFT

Antoni F. Jakubiec, San Mateo, and Thomas M. Daley, San Jose, both of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.

Continuation of Ser. No. 326,398, Mar. 2, 1989, Pat. No. 4,903,937. This application Feb. 26, 1990, Ser. No. 484,951
Int. Cl.[5] G05G *5/06*
U.S. Cl. 74—531 **22 Claims**

1. A mechanism for selectively locking and unlocking a translatable shaft comprising a spring mechanism concentric with the shaft, a member fixed to the shaft, said member having an inclined surface, a wall concentric with the shaft, a set of balls, an assembly for the balls, the balls and assembly being translatable together with respect to the shaft and the inclined surface between a first position where the balls are jammed between the inclined surface and the wall by the spring mechanism exerting a first force in a first direction along the shaft axis against the inclined surface and a second position where the balls are not in contact with the inclined surface, the shaft being in locked and unlocked conditions while the balls and assembly are respectively in the first and second positions, and means for selectively exerting a second force against the assembly in a second direction, the second force being greater than



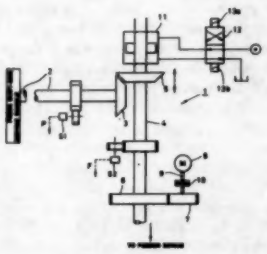
the first force applied to the balls and assembly so the assembly and balls are driven by the second force to cause the balls to be driven to the second position, the first and second directions being opposite to each other along the direction of the shaft axis.

4,957,019

POWER TRANSMISSION DEVICE OF A PRESS MACHINE

Kazuo Kubo, Ishikawa, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

PCT No. PCT/JP88/00433, § 371 Date Dec. 22, 1988, § 102(e) Date Dec. 22, 1988, PCT Pub. No. WO88/08342, PCT Pub. Date Nov. 3, 1988
PCT Filed Apr. 28, 1988, Ser. No. 339,821
Claims priority, application Japan, Apr. 28, 1987, 62-105586
Int. Cl.[5] F16H *3/22, 37/06*
U.S. Cl. 74—665 H **16 Claims**



1. A power transmission device of a press machine comprising:

a power transmission mechanism for coupling a press-side output shaft connected to a press body-side driving source and a power-delivering shaft connected to a feeder device, and transmitting the power of the press body-side driving source to the feeder device via said press-side output shaft and power-delivering shaft;

a motor for transmitting power to said power-delivering shaft through a course which is different from said power

transmission mechanism, and driving the feeder device independently of the press body-side driving source;

interrupting means for interrupting the power transmission by said power transmission mechanism;

first detection means for detecting the rotating position of said press-side output shaft;

second detection means for detecting the rotating position of said power-delivering shaft; and

control means for receiving detected values of said first and second detection means when an instruction for coupling said power transmission mechanism is received from a switch, and rotating said power-delivering shaft in the forward or reverse direction by driving said motor so that a difference between said detected values enters within a predetermined range, and coupling said power-delivering shaft to the press-side output shaft by driving said interrupting means when said difference enters within said range.

4,957,020

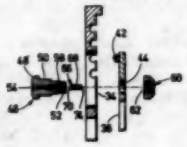
ADJUSTABLE PLIER

Arthur Monceret, Rt. 5, Box 126, Killen, Ala. 35645

Filed Oct. 10, 1989, Ser. No. 419,321

Int. Cl.[5] B25B *7/04, 7/06*

U.S. Cl. 81—414 **1 Claim**



1. Pliers having a pair of crossed members with a pivotal joint between members comprising:

A bore in one member, a slot in the other member and a pivot member slidably received within said bore and said slot whereby one member may move relative to the other member lengthwise of the slot and with jaws on each members; said pivotal joint comprising an arctuate circular rib cross sectioned on one said member and a plurality of open-ended circular cross sectioned grooves on the other said member extending crosswise of the slot, the said grooves being centered on the center line of the slot, said rib being receivable in any one of said grooves to provide a connection between the members carrying the working pressure of the jaws, the said rib and the said groove in which the said rib is received having surfaces engaging under working pressure of substantially the same radius causing the engaging surfaces to remain engaged under working pressure; said pivot member having a bore along its longitudinal axis with a head at one end, external thread into at the other end and said bore having internal threads; a screw having external threads along its longitudinal axis threadably received within said bore, said screw positioned with an aperture toward said head of said pivot member, and a cap having an aperture at one end and closed on the other end, said cap being threadably received over said pivot member at its threaded end.

4,957,021

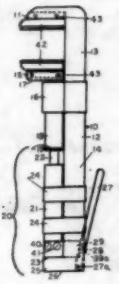
SELF-CONTAINED, HAND-HELD HYDRAULIC CLAMP/WRENCH

Darion L. Helton, 12421 I Whisper Hollow Dr., Maryland Heights, Mo. 63043

Filed May 23, 1989, Ser. No. 355,469

Int. Cl.[5] B25B *13/12*

U.S. Cl. 81—57.44 **1 Claim**



1. In an improved self-contained, hand-held hydraulic clamp/wrench having a main wrench body, a fixed jaw integral with an extending from said main wrench body, a lower, horizontal extension on said main wrench body, a movable jaw slidably connected to said main wrench body, said slidable jaw having a lower, vertically movable extension adapted to be driven by a hydraulic drive assembly, the improvement consisting of:

a completely self-contained, separable hydraulic drive assembly disposed adjacent, and removably secured to said main wrench body, said hydraulic drive assembly comprising in combination:

(1) a cylindrical housing defining a fluid reservoir and an integral hydraulic pump cylinder at the lower end of said housing, said housing having a vertical opening in the upper end and also having a check valve at the lower end of the housing;

(2) a hydraulic cylinder integral with said housing, said hydraulic cylinder being disposed axially inside and completely surrounded by the fluid reservoir, said hydraulic cylinder having a pressure relief valve communicating with said fluid reservoir, and also having a spring biased ball check valve axially disposed at its lower end;

(3) a pump cylinder integral with said housing and disposed with its long axis perpendicular to the vertical axis of said housing, said pump cylinder communicating with said fluid reservoir through a normally open ball check valve, and with said hydraulic cylinder through a normally closed ball check valve;

(4) a pump piston rod slidably disposed in the pump cylinder, said pump piston rod having actuating means connected to its outer end to cause it to draw hydraulic fluid from the fluid reservoir on its outward stroke and to inject the hydraulic fluid under pressure into the hydraulic cylinder on its inward stroke;

(5) a piston disposed in the hydraulic cylinder which moves vertically upward in response to actuation of the hydraulic pump and consequent increase in hydraulic fluid in the hydraulic cylinder;

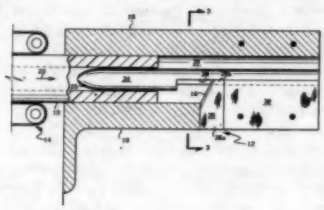
(6) a piston rod connected to the upper end of said piston, and extending axially out the upper end of the cylindrical housing through the vertical opening therein, said piston rod being urged into contact with the lower vertical extension of the movable jaw to urge the movable jaw towards the fixed jaw upon manual actuation of the hydraulic pump piston rod.

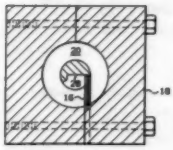
4,957,022

PIPE SLITTER

Michael R. Harris, Plano, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 3, 1989, Ser. No. 319,014
Int. Cl.[5] B26D *3/08*
U.S. Cl. 83—16 15 Claims





10. A method comprising the steps of:

positioning a mandrel, having a cylindrical portion and a tapered leading edge, in alignment with a longitudinal axis of a bore through a supporting frame;

positioning the cutting edge of a knife member so as to traverse a portion of the bore from the mandrel to the supporting frame, the cutting edge facing the entrance end of the bore, and being positioned non-radially with respect to the bore;

inserting the tapered leading edge of the mandrel into an inner diameter of a tubular piece, having an inner diameter and an outer diameter, as the tubular piece advances through the bore in the supporting frame; and

feeding the tubular piece through the bore of the supporting frame whereby the tubular piece is centered in the bore of said frame by said mandrel and is cut by the cutting edge of the knife member.

4,957,023

WRAP DISPENSER WITH AUTOMATIC CUTTING DEVICE

Stephen Chen, No. 53, Lane 536, Chang Tsao Road, Changhua, Taiwan

Filed Apr. 27, 1989, Ser. No. 343,702
Int. Cl.[5] B26D *5/38*
U.S. Cl. 83—372 7 Claims

1. An improved plastic wrap dispenser having an automatic cutting device disposed thereon comprising:

a housing having an upper reception room which permits the location of a pair of roll supporting members disposed on the opposite ends thereof so that a roll of the wrap can be housed in said upper reception room;

an openable upper cover disposed on top of said housing with the wrap extended outward therethrough;

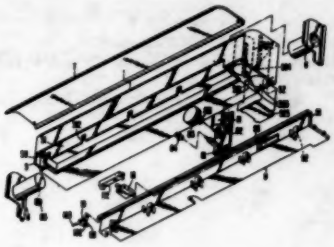
an elongate trough disposed at the lower portion of said housing, which is associated with a bottom cover, one end of said trough extending to communicate with a mounting seat disposed at one side of said housing;

a power transmission mechanism disposed within said mounting seat;

a cutting blade mount slidably moved within said trough in back and forth manner with a blade mounted thereon;

a limiting switch engaged with an operation button extended out of the front edge of said bottom cover, permitting a downward pulled and tensioned plastic wrap to abut thereagainst for control operation;

a partition board to divide said mounting seat into two portions in one of which a number of batteries are housed with a cap removably attached thereon;



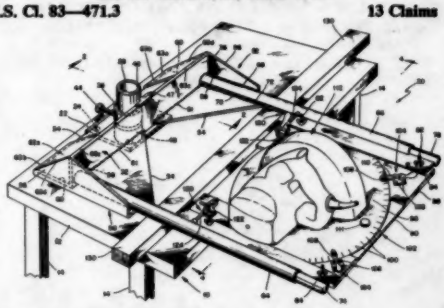
whereby the outward extended plastic wrap is pulled and abutting against said operation button to actuate said limiting switch which makes the power transmission mechanism operate so that the blade mount is moved to cut the extended wrap off the roll by means of a blade mounted thereon; once the operation button is released from the abutting pressure exerted by the extended wrap, the limiting switch is put in a non-operation position, and the transmission mechanism is made to operate in a reverse manner to bring the cutting blade mount back to its original position for next operation.

4,957,024

SAW MOUNT FOR USE ON A CONVENTIONAL WORKSHOP TABLE

James O. Albrecht, 4701 Aberdeen Rd., Mound, Minn. 55364

Continuation of Ser. No. 81,604, Aug. 13, 1987, abandoned, which is a continuation of Ser. No. 766,680, Aug. 19, 1985, abandoned, which is a continuation of Ser. No. 440,450, Nov. 10, 1982, abandoned, which is a continuation-in-part of Ser. No. 177,215, Aug. 11, 1980, abandoned. This application Mar. 9, 1989, Ser. No. 320,781
Int. Cl.[5] B27B *5/20*; B26D *1/18*
U.S. Cl. 83—471.3 13 Claims



1. A saw mount comprising;

a support member;

a base plate for attachment to a workshop table and a vertical post extending upwardly from said base plate;

said support member including an angle member having a vertical flange, a horizontal flange with a collar member thereon to be movably disposed on said vertical post;

means for holding said angle member in a spaced position from the base plate;

a pair of parallel elongated tubular rails, each having one end attached to and extending perpendicular from the vertical flange on said support member;

a turntable assembly for mounting a circular saw thereon; and

elongated generally U-shaped members slidably received in said rails for constraining and carrying said turntable assembly for rectilinear parallel movement with respect to said rails in a direction toward and away from said support member.

4,957,025

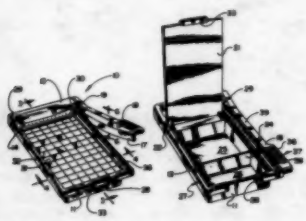
PAPER TRIMMER

Steven J. Beno, c/o Ideal School Supply Corp., 2245 Delany Rd., Waukegan, Ill. 60087

Filed Mar. 22, 1989, Ser. No. 326,914

Int. Cl.[5] B26D *5/10*

U.S. Cl. 83—607 **19 Claims**



1. A paper trimmer comprising:

a base having a front portion defining a first upwardly opening recess, a rear portion defining a second upwardly opening recess, and an edge portion;

a cover removably overlying said first recess;

a fixed cutter blade on said base edge portion and defining a top surface and an outer, first, cutting edge; and

a movable cutter blade pivotally mounted to said base and defining a lower, second cutting edge arranged to cut paper extending outwardly from said top surface of said fixed cutter blade.

4,957,026

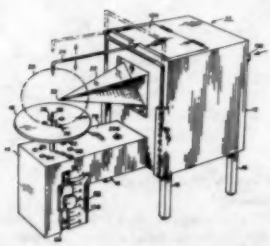
FOOD PREPARATION APPLIANCE FOR SCULPTURING FRUITS AND VEGETABLES

Jack R. Butterbaugh, 3213 S. Parnell, Apt. 2R, Chicago, Ill. 60616

Filed Sep. 22, 1989, Ser. No. 411,047

Int. Cl.[5] B26D *3/26*

U.S. Cl. 83—870 **32 Claims**



1. A food preparation mechanism comprising:

a housing,

a food support member supported by said housing, said food support member including a holding mean for retaining a food product, on said food support member,

a food cutting assembly supported by said housing,

an adjusting means supported by said housing, said adjusting means being effective to adjust the relative positions in which said food support member and said food cutting assembly are supported with respect to each other by said housing,

a reciprocating means supported by said housing, said reciprocating means being effective to provide reciprocating movement with respect to each other of said food support member and said food cutting assembly,

a drive train mounted on said housing, said drive train being responsive to said reciprocating movement to change the position of said food support member with respect to said food cutting assembly,

whereby reciprocating movement of said food cutting assembly causes a predetermined change in the position of said food support member with respect to said food cutting assembly, such that with each successive reciprocating movement toward each other of said food support member and said food cutting assembly, said food cutting assembly engages and cuts the food product in successive predetermined positions so as to form a continuous cut in said food product.

4,957,027

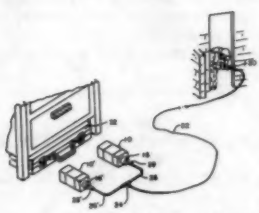
VERSATILE NONELECTRIC DEARMER

Christopher R. Cherry, La Plata, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 2, 1989, Ser. No. 415,758

Int. Cl.[5] F41A *19/57*

U.S. Cl. 89—1.14 **19 Claims**



1. A versatile dearmer using small arms cartridges comprising:

a barrel having a receiver sized to receive a small arms cartridge and a muzzle end; and

a housing to stabilize and hold said barrel in stable firing position; and

a mechanical firing circuit coimprised of a piston shaped on one end as a firing pin slidably mounted in a tubular guide operatively positioned to fire a small arms cartridge loaded in the receiving end of said barrel; and

an unspecified length of shock tube to initiate movement of the piston in said mechanical firing circuit; and

an initiator to initiate energy transfer in said unspecified length of shock tube.

4,957,028

RAMMER FOR ARTILLERY SHELLS

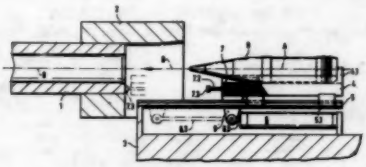
Karl Lieberum, Niedenstein; Werner Hofmeister, Reinhardshagen, and Peter Grunewald, Fuldabruck, all of Fed. Rep. of Germany, assignors to Firma Wegmann & Co. GmbH, Kassel, Fed. Rep. of Germany

Filed Jul. 14, 1989, Ser. No. 380,928

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1988, 3825662

Int. Cl.[5] F41A *9/44*

U.S. Cl. 89—47 7 Claims



1. A rammer for artillery shells having a carriage behind a gun tube for supporting a tray in alignment with a powder chamber, means disposed at a rear end of the tray to intercept a shell of the artillery shells, means mounting the rammer for movement on slides along a track paralleling an axis of the tube, a piston-and-cylinder drive mechanism coupled to the rammer to accelerate same toward the tube, and braking means to brake the rammer at a prescribed distance from a rear end of the tube, wherein the braking means has a shock absorber positioned in a longitudinal midplane of the carriage comprising a cylinder with a friction spring therein and a piston in the cylinder that moves against a force of the friction spring inside the cylinder and having a piston rod projecting forward from the cylinder beyond a front portion of the carriage with a stop mounted on the piston rod and resting directly against said rear end of the tube when the carriage is in a forward and braked position, wherein the friction spring converts at least ⅓ of the kinetic energy of the carriage by way of friction into heat, with a remaining ⅔ of the kinetic energy used to return the carriage to its starting position and another shock absorber for absorbing any excess energy.

4,957,029

ACTION FOR A WIND INSTRUMENT

Matti Kähönen, Porvoonkatu 37 A 4, 00520 Helsinki, Finland

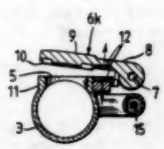
PCT No. PCT/FI88/00089, § 371 Date Mar. 1, 1989, § 102(e) Date Mar. 1, 1989, PCT Pub. No. WO88/09987, PCT Pub. Date Dec. 15, 1988

PCT Filed Jun. 8, 1988, Ser. No. 314,068

Claims priority, application Finland, Jun. 8, 1987, 872562

Int. Cl.[5] G10D *7/02*

U.S. Cl. 84—384 7 Claims



1. An action for a wind instrument having a body (3, 4) with holes (5) therein, comprising:

keys (6) turnable relative to the body (3, 4) so as to selectively open and close the holes (5) to produce notes of different pitch; and

two magnets (12) associated with each of said keys (6) so as to return each key (6) to an initial position after actuation of the key (6) ceases, a first of said two magnets being disposed on each of said keys (6) and a second of said two magnets being disposed on said body (3, 4).

4,957,030

ELECTRONIC MUSICAL INSTRUMENT HAVING A VIBRATO EFFECTING CAPABILITY

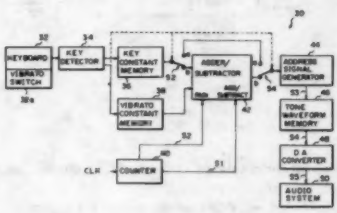
Isao Suzuki, Toyohashi, Japan, assignor to Kawai Musical Instruments Mfg. Co., Ltd., Japan

Filed May 23, 1989, Ser. No. 355,555

Claims priority, application Japan, May 26, 1988, 63-129066

Int. Cl.[5] G10H *1/02, 7/06*

U.S. Cl. 84—604 1 Claim



1. An electronic musical instrument capable of effecting vibratos with a tone being produced, comprising:

a keyboard having a vibrato switch;

key detecting means for detecting a key on said keyboard which is pressed down;

key constant storing means storing predetermined key constants each being associated with respective one of tones which may be produced by said instrument;

address signal generating means for generating an address signal by performing, every predetermined period of time, an arithmetic operation with the key constant associated with the key which is pressed;

tone waveform storing means storing amplitudes of a tone waveform each being associated with respective one of a plurality of sampling points, in the form of digitial values;

digital-to-analog converting means for sequentially converting the digital amplitudes read out of said tone waveform storing means in response to the address signals into an analog tone signal;

counting means for counting clock pulses which begin to appear when a power supply of said instrument is turned on;

vibrato constant storing means storing vibrato constant each being associated with respective one of the keys on said keyboard; and

adding and subtracting means for, when said vibrato switch is pressed, periodically performing addition and subtraction with the key constant and vibrato constant in response to an addition/subtraction switchover signal and an addition/subtraction execution control signal which are constituted by an output of said counting means.

4,957,031

AUTOMATIC MUSIC PLAYING APPARATUS HAVING PLURAL TONE GENERATING CHANNELS SEPARATELY ASSIGNABLE TO THE PARTS OF A MUSICAL PIECE

Masao Kondo, and Yasunao Abe, both of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

Filed Jan. 4, 1989, Ser. No. 293,375

Claims priority, application Japan, Jan. 6, 1988, 63-1081

Int. Cl.[5] G10H *1/38, 7/00*

U.S. Cl. 84—613 11 Claims

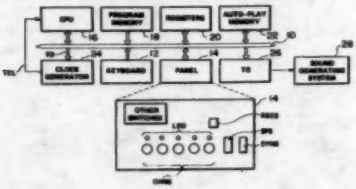
1. An automatic music playing apparatus, capable of gener-

ating a musical tone to be assigned for at least one of a melody part, chord part, and bass part of a musical piece, comprising:

(a) tone generating means having a plurality of tone generating channels for generating musical tone signals in response to music playing information;

(b) input means for inputting music playing information;

(c) memory means for storing music playing information, said memory means having plural storage areas with each storage area corresponding to a tone generating channel;



(d) means for detecting an amount of data stored in a storage area of said memory means;

(e) channel number designation means for separately designating a desired number of tone generating channels of the tone generating means for each part of the musical piece; and

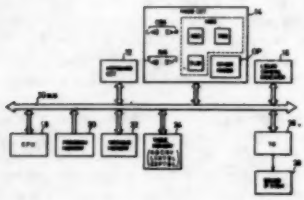
(f) assignment means for assigning music playing information to at least one of the storage areas based on a data amount detected by said means for detecting.

4,957,032

APPARATUS FOR REALIZING VARIABLE KEY SCALING IN ELECTRONIC MUSICAL INSTRUMENT

Katsuhiko Hirano; Masahiko Koike, and Hiroyuki Toda, all of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

Filed Nov. 24, 1987, Ser. No. 124,915
Int. Cl.[5] G10H 7/00, 5/00
U.S. Cl. 84—622 **10 Claims**



1. A key scaling apparatus for an electronic musical instrument, comprising:

a keyboard having a plurality of keys representing a plurality of notes, respectively, said notes being sectioned into at least three note groups each consisting of at least one note;

a memory unit having a plurality of memory areas associated with each of said notes or note groups;

manipulator knob means for producing musical tone preparing instruction signals determining characteristics of a musical tone to be produced;

registering means for writing, in said plural memory areas corresponding to a desired note or note group designated by an operated key of the keyboard, the instruction signals produced by the manipulator knob means;

reading-out means for reading out, when a performance mode is designated, from the concerned memory areas corresponding to the note or note group representing said operated key; and

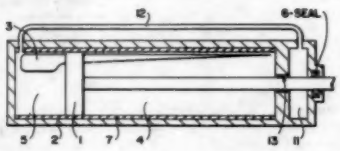
control means for controlling, based on the instruction signals supplied from said reading-out means, the characteristics of a musical tone intended to be produced.

4,957,033

DEVICE FOR SEALING THE MOBILE ELEMENTS OF AN ARTILLERY RECOIL BRAKE

Dominique Relange, 30, rue Henri Boyer, F-18000 Bourges, France

Filed Jun. 23, 1989, Ser. No. 371,558
Claims priority, application France, Jun. 30, 1988, 88 08804
Int. Cl.[5] F41A 25/02
U.S. Cl. 89—43.01 **9 Claims**



1. A sealing device between a piston rod and a cylinder of an artillery recoil brake, wherein the recoil brake comprises a cylinder containing a fluid, a piston slidably mounted in said cylinder, a piston rod connected to said piston, a low-pressure chamber and high-pressure chamber, said chambers being defined by portions of said cylinder and having variable volumes determined by the position of said piston within said cylinder, said sealing device comprising:

a medium-pressure chamber defined by said cylinder and separated from said high-pressure chamber by a partition, said partition having a bore formed therethrough which allows said piston rod to pass through said partition;

a substantially annular channel formed between and defined by said bore and said piston rod;

a pipe which provides communication between said medium-pressure chamber and said low-pressure chamber, said pipe having a greater cross-sectional area than that of said annular channel, wherein fluid gathered in said medium-pressure chamber flows toward said low-pressure chamber through said pipe; and

a seal fixed in an end wall of said cylinder which defines an end wall of said medium-pressure chamber, said seal being in fluid-contact with said piston rod which protrudes from said cylinder through said end wall.

4,957,034

CANDY CANE CONFIGURATION FOR MODULAR ARMOR UNIT

Server Tasdemiroglu, Oakland, Mich., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 15, 1989, Ser. No. 451,064
Int. Cl.[5] F41H 5/04
U.S. Cl. 89—36.02 **11 Claims**

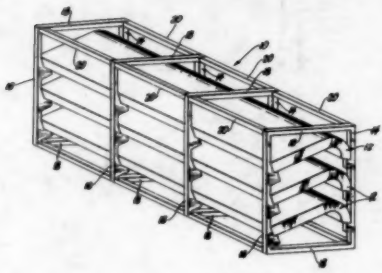
1. A modular armor structure for attachment to a military vehicle wherein the vehicle has a top, a bottom, and sides connecting the top and bottom, the modular armor being attached to one of the sides and comprising:

a frame;

a horizontal reference plane passing through the frame;

a plurality of vertically spaced internal beams mounted inside the frame and extended along the side of the vehicle, the internal beams having an outboard portion more distal from the side of the vehicle than an inboard portion of the internal beams, the outboard portions having wide

straight cross sections which are parallel with one another and which are oblique to the horizontal reference plane, the inboard portions of the internal beams having arcuate cross sections whose radial thickness is approximately equal to a cross sectional thickness of the outboard portions, the arcuate cross section defining an inside curve



whose radius of curvature is approximately equal to one-half the distance between straight cross sections, the angular dimension of the arcuate cross section being between 90 degrees and 150 degrees;

wherein the minimum sum of the average arc length of the arcuate cross section and width of the straight cross section is approximated by the formula

$$b_\phi = \frac{6M}{G h^2 g}$$

where b_ϕ is the minimum sum, M is the desired moment of resistance of the internal beam, G is the yield strength of a metal from which the internal beam is made, h is the thickness of the outboard portion of the internal beam, and g is a constant number.

4,957,035

ELECTROTHERMAL ACCELERATION DEVICE

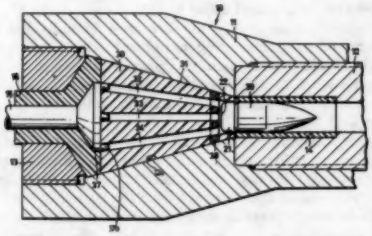
Armin Eskam, Langenfeld; Günter Frye, Erkrath, and Herbert Krumm, Kaarst, all of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany

Filed Apr. 12, 1989, Ser. No. 337,047

Claims priority, application Fed. Rep. of Germany, Apr. 28, 1988, 3814330

Int. Cl.[5] F41B *6/00*

U.S. Cl. 89—8 **12 Claims**



1. An electrothermal acceleration device for accelerating projectiles, comprising:

a housing having a breechblock at one end, an open end opposite said one end and a space between said one end and said open end; and

a plasma burner/projectile unit removably disposed in said housing, including

a projectile to be accelerated, said projectile being disposed in said space, and

a plasma burner at said one end, said plasma burner having at least two plasma channels formed therein;

said plasma burner including

first and second spaced apart electrodes,

means for electrically insulating said at least two plasma channels from each other and from said housing, said at least two plasma channels extending from said first electrode to said second electrode, said first electrode being disc shaped, being fixed at a frontal portion of said plasma burner, and having passage means therein through which said at least two plasma channels communicate with said space, and

means for generating an electric arc extending through said at least two plasma channels from said first electrode to said second electrode to produce and heat a plasma in said at least two plasma channels which accelerates the projectile from said space toward said open end of said housing;

said projectile being removably mounted to a front end of said plasma burner, wherein said passage means comprises bores in said disk-shaped electrode respectively aligned with said at least two plasma channels so that the inner peripheral surfaces of the bores define ring electrodes corresponding to the respective plasma channels, said at least two plasma channels communicating with said space through the respective aligned bores.

4,957,036

GRILLES FOR AIR CONDITIONER

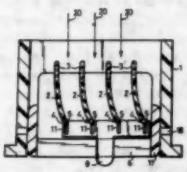
Kazuo Fujihara, and Takahiro Komori, both of Inazawa, Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Jul. 18, 1989, Ser. No. 381,318

Claims priority, application Japan, Jul. 27, 1988, 63-99692[U]; Oct. 28, 1988, 63-141824[U]; Nov. 8, 1988, 63-145804[U]; Jan. 23, 1989, 1-6164[U]

Int. Cl.[5] B60H *1/34*

U.S. Cl. 98—2 **13 Claims**



1. A grille for air conditioning comprising:

a main body portion having an opening for blowing out a wind;

a plurality of reinforcing plates each said plate having a longitudinal axis, a proximal edge located at a downstream side of the wind and a distal edge located at an upstream side of the wind, said reinforcing plates being connected at each longitudinal end thereof between opposing walls of said main body portion so that said reinforcing plates are disposed in parallel spaced relation, said reinforcing plates being disposed so that the edges thereof extend in a substantially intersecting direction with a blowing direction of the wind;

a plurality of flexible wind deflecting plates, each said flexible wind deflecting plate having a longitudinal axis, a proximal edge located at a downstream side of the wind and a distal edge located at an upstream side of the wind, said distal edge of each said flexible wind deflecting plate

being connected to the proximal edge of a respective said reinforcing plate so that the longitudinal axis of each said flexible wind deflecting plate is substantially parallel to the longitudinal axis of said respective reinforcing plates;

a plurality of front wind deflecting plates mounted to said main body so as to be disposed downstream of said flexible wind deflecting plates, each said wind deflecting plate having a longitudinal axis disposed substantially perpendicular to said longitudinal axis of said flexible deflecting plates; and

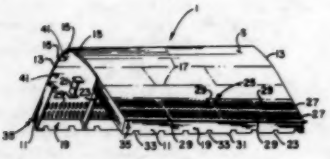
an operating piece slidably supported by one of said front wind deflecting plates, said operating piece having an upstream portion and a downstream portion, said upstream portion of said operating piece having grooves defined therein, each said groove engaging a center of said downstream edge of a said flexible wind deflecting plate, the engaged portions of said flexible wind deflecting plates being movable within said grooves.

4,957,037

ROOF RIDGE VENTILATOR

Robert A. Tubbesing, and Bruce D. Carter, both of St. Louis County, Mo., assignors to Greenstreak Plastics Products Co., Kirkwood, Mo.

Filed Jun. 12, 1989, Ser. No. 364,144
Int. Cl.[5] F24F 7/02
U.S. Cl. 98—42.21 **24 Claims**



9. In a roof ridge ventilator for an open roof ridge including an elongated base sheet member extending over and mounted to sloping roof surfaces on both sides of said open roof ridge, the improvement comprising: a pair of end walls attached to said base member and extending both generally parallel to said open roof ridge while also extending generally transverse to said base sheet member, a series of upwardly facing vents provided in said base sheet member in the vicinity of and along each end wall for ventilating air from beneath the roof through the open roof ridge and then through the upwardly facing vents to atmosphere, and an air deflector extending between each end wall and the upwardly facing vents in said base sheet member positioned to direct wind and wind driven water flowing upwardly along a sloping roof surface to follow a path above and over the upwardly facing vents while also creating a negative pressure differential above the upwardly facing vents to assist in ventilating air beneath the roof, each air deflector being angularly offset outwardly both with respect to said base sheet member and its associated end wall.

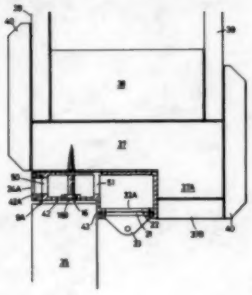
4,957,038

VENTILATION DEVICE

John G. Hamilton, 95 Warrender Park Rd., Edinburgh, Scotland EH9 1EW

Continuation of Ser. No. 318,646, Mar. 3, 1989, abandoned. This application Nov. 3, 1989, Ser. No. 432,315
Int. Cl.[5] E06B 7/02
U.S. Cl. 98—87 **12 Claims**

1. A ventilation device for use at a door, comprising an elongate member adapted to serve as part of a side frame structure of a doorway, said elongate member comprising a box structure which is L-shaped in transverse cross-section, the box-structure being adapted such that the shorter leg projects laterally so as an overhang a door and serve as a stop for the door, an air conduit being defined between spaced walls of the box structure for through passage of ventilating air, said elongate structure including an inlet port to said conduit and a discharge port from the conduit, one of said ports being located in the shorter leg of the box structure such that said one port faces downwardly, and a reinforcing structure extends between the spaced wall portions of the box structure in said shorter leg, said reinforcing structure defining openings for passage of air via said one port in the shorter leg.

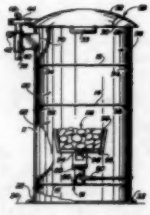


4,957,039

FIVE IN ONE COOKER

Clyde L. Reyes, 515 E. Tennessee, Midland, Tex. 79701

Filed Jan. 17, 1990, Ser. No. 466,185
Int. Cl.[5] A47J 37/00
U.S. Cl. 99—340 **12 Claims**



1. A combination fajitas cooker and barbecue grill apparatus comprising an upwardly opening chamber having a lower end opposed to an upper end, a support base at said lower end, heating means supported within said chamber, a grill, means supporting said grill within said chamber in spaced relationship respective to said upper and said lower end, and a closure member attached to said upper end;

said closure member is in the form of a dome having a circumferentially extending peripheral edge portion from which said closure member upwardly slopes to form the dome when in one operative position and which can be inverted to form a frying pan within which fajitas can be cooked;

support means by which said closure member is supported by said chamber and by which said closure member can be selectively elevated above said upper end and thereby form an adjustable flue by which the escape of heat from the interior of said chamber can be controlled;

said support means further enables said closure member to be pivoted in a horizontal plane whereby said closure member can be pivoted towards and away from the longitudinal vertical axis of said chamber,

said support means further pivotally supports said closure means for rotation about a horizontal axis whereby the

closure member can be rotated from a dome configuration into a frying pan configuration; whereby:

food can be cooked in said pan while other food is simultaneously supported on said grill, and said pan can be elevated above said upper end to control the heat received from said heating means, and said pan can be pivoted away from said chamber and rotated to pour the contents thereof out of the pan, and said closure member can be rotated from a pan configuration into a dome configuration and lowered to close the upper end of said chamber.

4,957,040

APPARATUS FOR MAKING BREAD

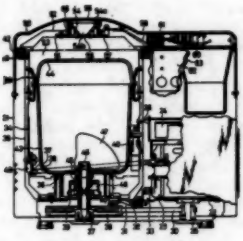
Hirofumi Nakakura, Osaka; Morio Shibata, Amagasaki; Haruo Ishikawa, Kawanishi; Akihisa Nakano; Hiromi Hirota, both of Osaka, and Hajime Oyabu, Kawanishi, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Division of Ser. No. 64,253, Jun. 19, 1987, Pat. No. 4,885,176. This application Aug. 24, 1989, Ser. No. 397,943

Claims priority, application Japan, Jun. 20, 1986, 61-145127; Jun. 24, 1986, 61-147319; Dec. 18, 1986, 61-300037; Dec. 18, 1986, 61-300041; Dec. 20, 1986, 61-305117; Dec. 23, 1986, 61-305518; Dec. 24, 1986, 61-306212; Dec. 26, 1986, 61-315762; Dec. 26, 1986, 61-315763; Jan. 30, 1987, 62-20806

Int. Cl.[5] A47J *27/00*

U.S. Cl. 99—348 **8 Claims**



1. A bread-making apparatus, comprising

a housing;

a baking container disposed in the housing, said baking container being provided with an opening and a source of heat;

a kneading container suitable for containing bread ingredients and water, said kneading container being detachably mounted in the baking container;

a lid assembly positioned above the kneading container, said lid assembly being capable of assuming a first and second positions, the first position wherein the lid assembly covers the opening of the baking container and the second position where the lid assembly is positioned away from the opening;

a kneading blade movably disposed in the kneading container;

a motor for operating the kneading blade for kneading bread ingredients and water into a dough in the kneading container;

means for detecting temperature in the dough being kneaded in the kneading container;

a yeast charger for charging dry yeast into the kneading container; and

a control unit for controlling the source of heat and the motor.

4,957,041

EXTRUDER APPARATUS FOR PRODUCING AN AT LEAST PARTIALLY BAKED PRODUCT HAVING A COOKIE-LIKE CRUMB STRUCTURE INCLUDING A POST-EXTRUSION RADIO FREQUENCY DEVICE

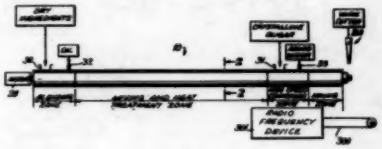
Bernhard H. van Lengerich, Ringwood, N.J., assignor to Nabisco Brands, Inc., East Hanover, N.J.

Filed Jun. 7, 1989, Ser. No. 362,377

The portion of the term of this patent subsequent to Jul. 3, 2007, has been disclaimed.

Int. Cl.[5] A21C *3/04*; A47J *27/12*; A23P *1/00*

U.S. Cl. 99—353 **17 Claims**



1. An extruder, which comprises

a housing including a screw channel formed along the longitudinal axis of the housing;

at least one screw-type element rotatably received within the screw channel to convey and mix ingredients;

a feed port means arranged in the housing adjacent the upstream end thereof to input ingredients into the screw channel for conveyance and mixing by the screw-type element;

means for inputting at least certain ingredients of a cookie-like dough formulation, including oil and flour, with less than a preselected total water content, by weight, of the ingredients;

the means for inputting being coupled to the feed port means;

an added water inlet port arranged in the housing downstream from the feed port means to input water into the screw channel;

a vigorous mixing zone formed by the screw channel and screw-type element intermediate the feed port means and the added water inlet port to vigorously mix and convey the ingredients input into the feed port means;

a temperature control means operating to elevate the temperature of the screw channel for heat treatment of the ingredients input into the feed port means in a heat treatment zone of the housing extending intermediate the feed port means the added water inlet port;

a source of water coupled to the added water inlet port to add a preselected amount of water through the added water inlet port to increase the water content and modify the consistency of the ingredients input into the feed ports means at a location in the screw channel downstream from the vigorous mixing and heat treatment zones;

a mixing zone formed by the screw channel and screw-type element downstream from the added water inlet port and operating to mix the added water throughout the heat treated ingredients under pressure and temperature conditions to avoid substantial oil separation from the heat treated ingredients and added water; and

an output means at the downstream most end of the housing; and

a radio frequency device coupled to the output means of the extruder to receive and further heat treat the ingredients output by the output means.

4,957,042

EXTRUDER AND CONTINUOUS MIXER ARRANGEMENT FOR PRODUCING AN AT LEAST PARTIALLY BAKED PRODUCT HAVING A COOKIE-LIKE CRUMB STRUCTURE INCLUDING A POST-EXTRUSION MICROWAVE DEVICE

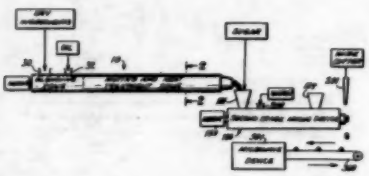
Bernhard H. van Lengerich, Ringwood, N.J., assignor to Nabisco Brands, Inc., East Hanover, N.J.

Filed Jun. 7, 1989, Ser. No. 362,620

The portion of the term of this patent subsequent to Jul. 3, 2007, has been disclaimed.

Int. Cl.[5] A21C *3/04;* A47J *27/12;* A23P *1/00*

U.S. Cl. 99—353 18 Claims



1. An apparatus for producing a product having a cookie-like crumb structure, which comprises

an extruder including a housing having a screw channel formed along the longitudinal axis of the housing;

at least one screw-type element rotatably received within the screw channel to convey and mix ingredients;

a feed port means arranged in the housing adjacent the upstream end thereof to input ingredients into the screw channel for conveyance and mixing by the screw-type element;

means for inputting at least certain ingredients of a cookie-like dough formulation, including oil and flour, with less than a preselected total water content, by weight, of the ingredients;

the means for inputting being coupled to the feed port means;

a vigorous mixing zone formed by the screw channel and screw-type element downstream from the feed port means to vigorously mix and convey the ingredients input into the feed port means;

a temperature control means operating to elevate the temperature of the screw channel for heat treatment of the ingredients input into the feed port means in a heat treatment zone of the housing extending downstream from the feed port means;

a second stage mixing apparatus including an inlet port coupled to the downstream end of the extruder housing to receive, mix and convey the heat treated ingredients conveyed through the extruder;

an added water inlet port arranged in the second stage mixing apparatus;

a source of water coupled to the added water inlet port to add a preselected amount of water through the added water inlet port to increase the water content and modify the consistency of the heat treated ingredients from the extruder input into the inlet port of the second stage mixing apparatus;

a mixing zone formed by the second stage mixing apparatus and operating to mix the added water throughout the heat treated ingredients under pressure and temperature conditions to avoid substantial oil separation from the heat treated ingredients and added water; and

an output means at the downstream most end of the second stage mixing apparatus; and

a microwave device coupled to the output means of the continuous mixing apparatus to receive and further heat treat the ingredients output by the output means of the continuous mixing apparatus.

4,957,043

FRUIT DISINTEGRATING APPARATUS

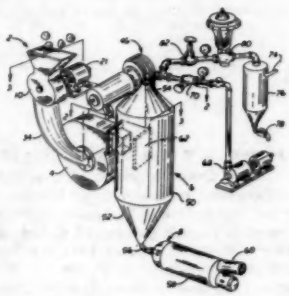
Jesus A. Silvestrini, and Jose E. Barbier, both of Mendoza, Argentina, assignors to IMDEC S.A., Tampa, Fla.

Filed Mar. 31, 1989, Ser. No. 331,699

Claims priority, application Argentina, Apr. 26, 1988, 310,677

Int. Cl.[5] A23N *1/00;* A23L *1/212*

U.S. Cl. 99—472 13 Claims



1. Fruit disintegrating apparatus for pulverizing fruit into pulp and juice, comprising

fruit introducing means for substantially limiting the rate of introduction of fruit and of ambient atmosphere into said apparatus to a predetermined maximum;

a generally circularly cylindrical rotor housing having an entrance aperture connected to said fruit introducing means adjacent the cylindrical axis of said rotor housing and having an outlet channel extending generally tangential to the cylindrical sidewall of said rotor housing;

a rotor drivingly rotated within said rotor housing about an axis of rotation generally coincident with said rotor cylindrical housing axis, said rotor having a fruit receiving portion adjacent said housing entrance aperture and having a fruit discharge portion radially spaced therefrom with said fruit discharge portion being closely proximal said housing cylindrical sidewall, such that said cylindrical sidewall blocks discharge of fruit from said rotor except when said rotor fruit discharge portion is adjacent said housing outlet channel, whereby fruit carried by said rotor will be discharged from said rotor and said housing through said housing outlet channel generally tangential to said housing cylindrical sidewall; and

a fruit disintegration chamber connected to the outer end of said outlet channel to receive fruit therefrom, said chamber having

a fruit disintegrating member having a fruit impact surface generally normal to the path of fruit moving through said housing outlet channel, whereby fruit moving through the outlet channel will be impelled against the impact surface to disintegrate the fruit into pulp and juice for subsequent packing and

pulp and juice removal means for removing said pulp and juice from said fruit disintegration chamber for subsequent packing.

4,957,044

DOUBLE SIDED SCREENER FOR PRINTED CIRCUIT BOARDS

John V. Crosin, 17282 Mt. Wynne Cir., Fountain Valley, Calif. 92708

Filed Jun. 19, 1989, Ser. No. 368,460

Int. Cl.[5] B41F *15/08, 17/00*

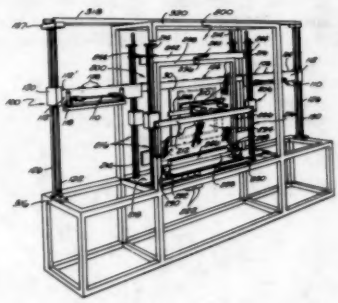
U.S. Cl. 101—35 14 Claims

1. A vertical screening apparatus for simultaneously screen-

ing each side of a printed circuit board with inking material, comprising:

a screen print assembly comprising two vertically oriented chases pivotally mounted about their bases in opposing spacial parallel relationship with respect to each other;

a squeegee vertical drive system that reciprocates through a vertical plane on opposite sides of the chases, consisting of



opposing flood blades and print squeegees adapted for sequentially contacting and compressing print screens disposed within each of said chases; and

a board transport mechanism synchronously integrated with said screen print assembly, above and extending from a feed platen assembly to an output platen assembly comprising means for sequentially moving said board into and out of a print zone within said screen print assembly.

4,957,045

DOCTOR FOR SCREEN PRINTING

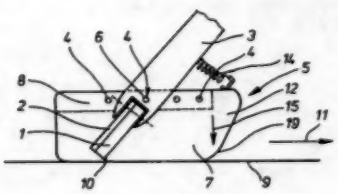
Elmar Messerschmitt, Paul-Hosch-Str. 13, 8000 Munchen 60, Fed. Rep. of Germany

Filed Dec. 5, 1988, Ser. No. 279,656

Claims priority, application Fed. Rep. of Germany, Apr. 16, 1988, 3812826

Int. Cl.[5] B41F *15/44*

U.S. Cl. 101—123 **11 Claims**



1. A doctor for screen printing, comprising a doctor strip with an edge for contact on a printing screen and an elastic backing, said doctor strip and elastic backing being laminated together in face to face contact over at least substantially the whole of their surface areas to form a composite material, the doctor strip and the backing having different degrees of elasticity and being installed together in a doctor holder, and a retainer means for a printing screen positioned at respective left and right hand ends of said doctor holder, and pivotal mounting means for pivotally mounting said respective left and right hand ends of said doctor holder on said retainer.

4,957,046

PROJECTILE

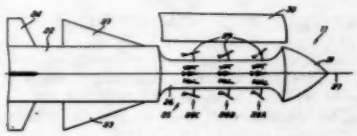
Michael C. Puttock, Ashford, England, assignor to Thorn EMI Electronics Limited, Hayes, England

Filed Nov. 22, 1988, Ser. No. 274,374

Claims priority, application United Kingdom, Dec. 12, 1987, 8729073

Int. Cl.[5] F42B *13/50*

U.S. Cl. 102—489 **5 Claims**



1. A projectile having a nose portion and a body portion, said projectile comprising a plurality of winged, fin-stabilised flechettes mounted in said body portion wherein each flechette is mounted with its longitudinal axis at a pre-set pitch to a longitudinal axis of said projectile, the projectile further comprising means for releasing each flechette, the releasing means allowing each flechette to lift off the projectile without any additional lateral force, whereby, in use, with the projectile moving on a projectile trajectory, each released flechette flows a respective trajectory parallel to and at a predetermined distance from said projectile trajectory, said predetermined distance being determined by said pre-set pitch.

4,957,047

CABLE TRANSPORT INSTALLATION

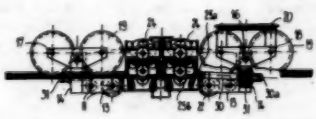
Fritz Feuz, Thun, and Walter Brawand, Bönigen, both of Switzerland, assignors to Von Roll Transportsysteme AG, Thun, Switzerland

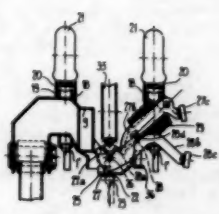
Continuation of Ser. No. 172,421, Mar. 23, 1988, abandoned. This application Oct. 27, 1989, Ser. No. 427,992

Claims priority, application Switzerland, Mar. 25, 1987, 144/87

Int. Cl.[5] B61B *12/12*

U.S. Cl. 104—204 **15 Claims**





1. An aerial cable transport installation comprising:

a plurality of cables including two substantially horizontally spaced support cables and a revolving traction cable arranged between said two support cables;

a plurality of vehicles supported by said two support cables and moved by said revolving traction cable;

a carriage for each of said vehicles;

actuatable cable clamp means for each carriage including jaw means for coupling the carriage of each vehicle with the revolving traction cable; and

means for displaceably connecting each said jaw means with the corresponding carriage for relative elevational movement therebetween.

4,957,048

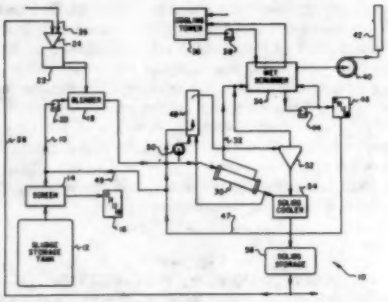
APPARATUS FOR TREATING CRUDE OIL SLUDGES AND THE LIKE

Gary L. Beer, and Ying H. Li, both of Plano, Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Division of Ser. No. 84,596, Aug. 12, 1987, Pat. No. 4,775,457. This application Jul. 14, 1988, Ser. No. 219,019

Int. Cl.[5] F23D *14/00*

U.S. Cl. 110—235 **3 Claims**



1. A system for treating sludges containing relatively heavy hydrocarbon liquid and solids which are coated with said hydrocarbon liquid, said system comprising:

a combustion unit for combusting hydrocarbons to provide gaseous combustion products and a substantially hydrocarbon free, friable solids mixture;

a source of solids material having a particle size which averages about one inch or less and having a relatively high liquid adsorption capability;

means for mixing said sludge with said solids material and for conveying a mixture of said solids material and said sludge comprising a flowable and friable solids mixture to said combustion unit;

means for receiving a friable, hydrocarbon free solids mixture from said combustion unit for disposal;

means for receiving gaseous combustion products from said combustion unit and for condensing at least part of said gaseous combustion products; and

means for conveying a mixture of condensed combustion products and solids fines to said combustion unit.

4,957,049

ORGANIC WASTE FUEL COMBUSTION SYSTEM INTEGRATED WITH A GAS TURBINE COMBINED CYCLE

Charles Strohmeyer, Jr., Gladwyne, Pa., assignor to Electrodyne Research Corp., Gladwyne, Pa.

Filed Feb. 22, 1990, Ser. No. 483,580

Int. Cl.[5] F23B *7/00*

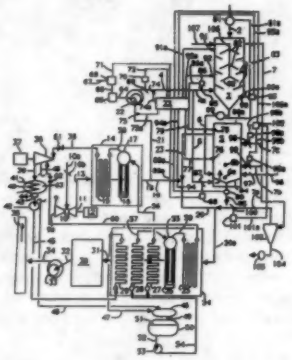
U.S. Cl. 110—234 **7 Claims**

1. An apparatus for integrating the firing and heat transfer components of a gas turbine combined steam generating plant with means for stabilizing combustion of high moisture content waste fuel, adapted to reheat said gas turbine exhaust gas intermediately within said combined cycle steam generating plant which comprises:

means defining a gas turbine combined cycle steam generating plant in which said reheating of said gas turbine exhaust gas intermediately within said combined cycle is carried out;

said gas turbine comprising a serially connected air intake, compressor, first combustor for firing gas and/or distillate fuel oil under compression, a gas turbine powered by expansion of exhaust gas from said first combustor, an exhaust port for discharge of said hot expanded exhaust gas from said gas turbine and, means whereby said gas turbine drives an energy consumer;

a first contained gas flow path connecting to and receiving said exhaust gas from said exhaust port;



a second contained gas flow path connected to and receiving said exhaust gas from said first contained gas flow path;

serial means for drying and combusting said high moisture content waste fuel;

said second contained gas flow path having means to discharge said exhaust gas selectively to said serial means drying portion and to said serial means combusting portion;

means for combining said exhaust gas from said drying portion and from said combusting portion of said serial means, and for discharge of said combined exhaust gas, after drying and combusting, to a third enclosed gas path containing steam generating means.

4,957,050

COMBUSTION PROCESS HAVING IMPROVED TEMPERATURE DISTRIBUTION

Min-Da Ho, Somers, N.Y., assignor to Union Carbide Corporation, Danbury, Conn.

Filed Sep. 5, 1989, Ser. No. 402,556

Int. Cl.[5] F23G *7/04*

U.S. Cl. 110—346 **20 Claims**

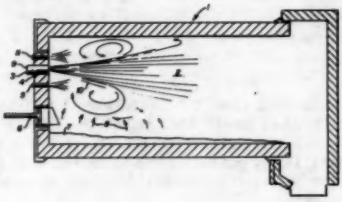
1. A combustion process comprising:

(A) providing combustible vapor to a combustion zone:

(B) providing oxidant, having an oxygen concentration of at least 25 percent, into the combustion zone separately from the provision of said combustible vapor at a high velocity sufficient to establish recirculating matter within the combustion zone;

(C) providing atomized liquid into the combustion zone separately from said oxidant and said combustible vapor to provide coolant to the combustion zone and mixing coolant with recirculating matter;

(D) mixing resulting coolant with said combustible vapor and/or oxidant; and



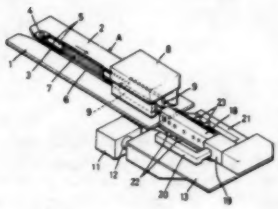
(E) combusting the resulting combustible vapor with the resulting oxidant.

4,957,051

AUTOMATIC FITTING APPARATUS FOR HOSE PART OF HALF MADE PANTYHOSE

Hiroji Maegawa, Kashiwara, and Tatsuro Omuta, Kitakatsuragi, both of Japan, assignors to Takatori Corporation, Japan

Filed Apr. 5, 1989, Ser. No. 333,580
Claims priority, application Japan, Apr. 11, 1988, 63-88542
Int. Cl.[5] D05B *21/00*
U.S. Cl. 112—121.12 **4 Claims**



1. Apparatus for delivering hose parts of half made pantyhose to a pantyhose finishing machine, said apparatus comprising:

a forwarding mechanism means for holding a hose part of pantyhose at a welt portion thereof and conveying a hose part of pantyhose so held in a forward direction in the apparatus;

a hose part-receiving table disposed in the apparatus to receive hose parts of pantyhose conveyed by said forwarding mechanism, said table defining a pair of slits into which respective hose parts of pantyhose are insertable, said table having a horizontally extending pivot axis about which said table is rotatably mounted in the apparatus, and said table comprising a suction member means extending between said slits for exerting suction to suck portions of hose parts of pantyhose disposed in said slits thereto, and suction device means disposed across each of said slits from said suction member means for also exerting suction to suck other portions of hose parts of pantyhose disposed in said slits thereto;

drive means operatively connected to said table for rotating said table about the pivot axis thereof between upright and sideways positions of the table;

transfer means operatively disposed between said forwarding mechanism means and said hose part-receiving table for transferring hose parts of pantyhose from said forwarding mechanism means into the slits defined in said table when said table is positioned by said drive means in said upright position; and

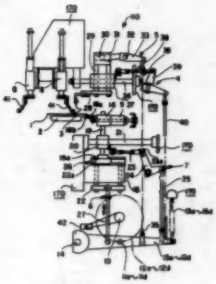
stretching means disposed adjacent said hose part-receiving table for stretching, at the inside of the welt portions thereof, hose parts of pantyhose sucked to said suction member means and said suction device means to grasp the hose parts when said table is positioned at said sideways position thereof by said drive means, and for withdrawing the hose parts so grasped from said table.

4,957,052

TRIPLE FOLDING DEVICE FOR FOLDING A TOWEL HEM

Kenichi Sotome, Utsunomiya, and Munetaka Nagasaki, Kadoma, both of Japan, assignors to SSMC Inc., Edison, N.J.

Filed Apr. 17, 1989, Ser. No. 338,818
Claims priority, application Japan, May 24, 1988, 63-125029
Int. Cl.[5] D05B *35/04*
U.S. Cl. 112—147 **5 Claims**



1. A triple folding device for folding a hem of a towel comprising:

a first cam, a second cam, a third cam, and a fourth cam respectively fixed to a main shaft and driven by a single rotative drive source;

a first lever, a second lever, a third lever, a fourth lever respectively swingably supported by a shaft of a body of a sewing machine and swung by said first cam, said second cam, said third cam, and said fourth cam via rollers;

a first thrust block fixedly supported by a first horizontal guide shaft fixed to the body and having a through hole therein;

a first link mechanism having one end fixed to said first thrust block and another end connected to said first lever so that a swinging motion of said first lever is converted to a horizontal motion of said first thrust block;

a block connected to a guide ruler holder by a first guide shaft composed of a pair of guide shafts, said first guide shaft slidably penetrating said through hole of said first thrust block;

a second link mechanism having one end fixed to said block and another end connected to said second lever so that a swinging motion of said second lever is converted to a vertical motion of said first guide shaft;

a working table fixed to said body to which a towel material having a hem at one end thereof is delivered;

a guide ruler fixed to said guide ruler holder and positioned over said working table, said guide ruler movable horizontally by horizontal motion of said first thrust block and vertically by vertical motion of said first guide shaft whereby said guide ruler is moved downwardly by a lowering motion of said first guide shaft to thereby press the hem of the towel and movable forwadly by forward motion of said first thrust block to thereby move away from said hem of the towel;

an upper presser fixed to an upper presser holder for folding said hem of the towel, said upper presser holder having a second guide shaft fixed thereto;

a lower presser positioned under said upper presser and supported slidably horizontally by said upper presser holder;

a second thrust block supported by a second horizontal guide shaft fixed to said body for slidably vertically supporting said second guide shaft;

a third link mechanism having one end fixed to said second guide shaft and another end connected to said third lever so that a swinging motion of said third lever is converted to a vertical motion of said second guide shaft whereby said upper presser is moved horizontally;

a fourth link mechanism having one end fixed to said second thrust block and another end connected to said fourth lever so that a swinging motion of said fourth lever is converted to a horizontal motion of said second thrust block whereby said upper presser is moved vertically;

a first drive unit provided at said upper presser holder for driving said lower presser to move horizontally so that said lower presser is moved away from said hem of the towel when said upper presser is moved into said hem of the towel; and

a pressing unit driven by a second drive unit for pressing and holding said folded hem of the towel laid between said working table and said pressing unit.

4,957,053

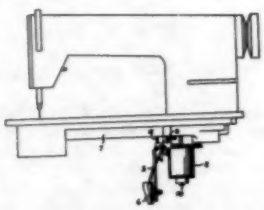
LINKING MECHANISM FOR SEWING MACHINE

Hsiao C. Liu, No. 21, Hwating Street, Taipei City, Taiwan

Filed Aug. 12, 1988, Ser. No. 231,273

Int. Cl.[5] D05B *29/02*

U.S. Cl. 112—237 **2 Claims**



1. A transmission mechanism used for sewing machines having at least a carriage (7), said transmission mechanism comprising:

a base plate (1) having a plurality of mounts (11) formed thereon, four bolts (12) each having a plastic head and being threadably disposed at one of four respective corners of said base plate (1), said base plate (1) having an opening (13) being formed therethrough;

a switch box (6) supported by a first end of a connecting rod (5), said connecting rod (5) having a second end coupled to a fixing clamp (4);

a bar member (3) coupled to said fixing clamp (4) on one end thereof, said bar member (3) being additionally coupled to said plurality of mounts (11) of said base plate (1) and a carriage (7); and,

transmission means (2) for controlling a sewing machine presser responsive to a control signal from said switch box (6), said transmission means (2) being vertically attached to said base plate (1) under said opening (13), said transmission means (2) having a plunger (21) passable through said opening (13), said plunger (21) being capable of performing a reciprocating vertical movement.

4,957,054

METHOD FOR THREE DIMENSIONAL SEWING OF SUIT COAT BODY AND SLEEVES THEREFOR

Kuniharu Sakuma, Saitama; Hiroshi Honda, Tokyo; Koukichi Maehata, Tokyo, and Takayuki Aikawa, Tokyo, all of Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan

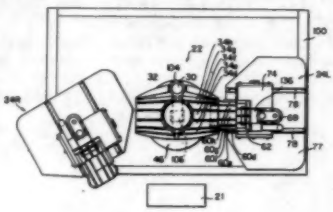
Division of Ser. No. 299,568, Jan. 18, 1989, Pat. No. 4,915,040.

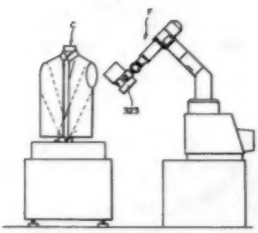
This application Dec. 5, 1989, Ser. No. 446,289

Claims priority, application Japan, Jun. 1, 1988, 63-132866

Int. Cl.[5] D05B *21/00*

U.S. Cl. 112—262.2 **1 Claim**





1. A method for three dimensional sewing of a suit coat body and suit sleeves of a suit material, comprising the steps of:

(1) providing a suit coat body support member which supports a suit coat body turned inside out thereon;

(2) positioning a sleeve support member adjacent to said suit coat body support member, said sleeve support member having sleeve supporting bars deformable from a contracted position to an expanded position;

(3) placing the shoulder end of a sleeve onto the sleeve bars while the sleeve bars are in the contracted position;

(4) expanding the sleeve bars to the expanded position to hold and maintain the shoulder end of the sleeve against said sleeve bars;

(5) placing a suit coat body which has been turned inside out onto said suit coat body support member;

(6) moving the sleeve support member toward said suit coat body support member and bringing the seam line of the sleeve into a predetermined position in relation to a seam line of said suit coat body;

(7) transferring the sleeve to said suit coat body support member while keeping the respective seam lines in the predetermined positional relation, and holding and keeping the sleeve on the suit coat body support member;

(8) contracting the sleeve bars to the contracted position and

moving the sleeve support member away from the suit coat body support member; and

(9) moving a sewing machine along seam lines of the suit coat body and sleeve to produce three dimensional sewing of the suit coat body and the sleeve to each other.

4,957,055

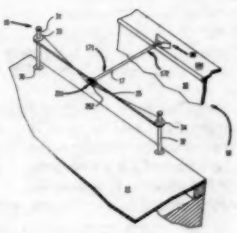
FENDER FOR FLOATING VESSEL

Leonard W. Johnson, 483 Main St., Amesbury, Mass. 01913

Filed Jun. 27, 1989, Ser. No. 372,291

Int. Cl.[5] B63B *59/02*

U.S. Cl. 114—219 **10 Claims**



1. A fender for maintaining separation between a vessel and a wharf to which the vessel is moored, such fender comprising:

a thrust rod having two ends, hereinafter called a "wharf end" and a "vessel end;"

attachment means for attaching the vessel end of the thrust rod to the vessel;

an elastic shock absorber element attached to the wharf end of the thrust rod, such that the elastic shock absorber element is transverse to the thrust rod, the elastic shock absorber element having a first end and a second end, the elastic shock absorber element being linked to the wharf end of the thrust rod at some point between the first and second ends of the elastic shock absorber element; and

elevation means, rigidly attached to the wharf, for supporting the elastic shock absorber element and the thrust rod at some distance away from the top of the wharf, such that the thrust rod is substantially horizontal and is subject only to forces applied by the elastic shock absorber element and the vessel, the elevation means including a first arm and a second arm attached respectively to the first and second ends of the elastic shock absorber element;

such that translation of the wharf end of the thrust rod with respect to the wharf, such translation caused by movement of the vessel towards the wharf, is opposed by forces exerted by the elastic shock absorber element.

4,957,056

RETRACTABLE ARRANGEMENT FOR FISHING BOAT CONSOLE COMPONENTS

Robert L. Martin, Springfield, Mo., assignor to Tracker Marine Corporation, Springfield, Mo.

Filed May 15, 1989, Ser. No. 351,397

Int. Cl.[5] B63B *17/00*

U.S. Cl. 114—343 **20 Claims**

1. In a fishing boat having a control console, the improvement comprising:

a windscreen;

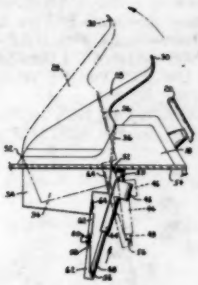
means for mounting said windscreen on the console for pivotal movement about a hinge axis between a raised position and a lowered position;

an extensible and retractable power actuator having opposite upper and lower ends and being extensible to increase the distance between said ends;

means for pivotally connecting the upper end of said actuator with said console;

a rigid bracket having upper and lower ends, said upper end of the bracket being connected with the windscreen; and

means for pivotally connecting the lower end of said bracket



with the lower end of said actuator in a manner to effect movement of the windscreen toward the raised position upon retraction of the actuator and toward the lowered position upon extension of the actuator.

4,957,057

JOGGER'S NIGHTSTICK

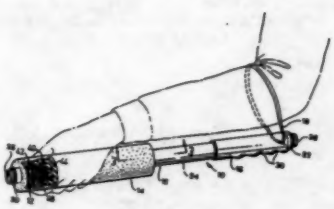
Albert Marcucci, 1493 Kenmuir Avenue, Mississauga, Ontario, Canada L5G 4B6

Continuation-in-part of Ser. No. 911,600, Sep. 25, 1986, abandoned. This application Dec. 30, 1988, Ser. No. 292,072

Claims priority, application Canada, Jun. 5, 1986, 510956

Int. Cl.[5] A63H *5/00*; G08B *21/00*

U.S. Cl. 116—22 A **20 Claims**



1. A baton comprising an elongate, tubular body having (a) opposed first and second ends, (b) a striking portion terminating at said first end, (c) a soft padding surrounding said striking portion and extending towards said second end and (d) sound producing means for producing a sound, said sound producing means having one part which moves relative to said body in response to the movement of the baton.

4,957,058

MACHINE FOR APPLYING GAS-THERMAL COATINGS

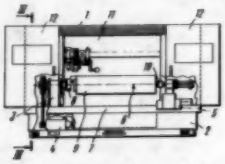
Alexandr M. Boguslavsky; Viktor F. Semenikhin; Vladimir I. Chergikalo; Lev I. Rozenman; Yakov K. Tregub; Arkady I. Risman; Yankel M. Topopolsky; Egor V. Khatanzeisky, and Eduard A. Rubin, all of Kiev, U.S.S.R., assignors to Nauchno-Proizvodstvennoe Objedinenie Po Vypusku Mekhanicheskogo Svarochnog Oborudovanija, Kiev, U.S.S.R.

PCT No. PCT/SU87/00128, § 371 Date Jul. 14, 1989, § 102(e) Date Jul. 14, 1989, PCT Pub. No. WO89/04879, PCT Pub. Date Jun. 1, 1989

PCT Filed Nov. 16, 1987, Ser. No. 397,441

Int. Cl.[5] B05C 1/02

U.S. Cl. 118—323 5 Claims



1. A machine for applying gas-thermal coatings to workpieces comprising a box-like chamber, the chamber accommodating a headstock provided with a rotation drive, and a tailstock having a guide and capable of longitudinal movement relative to the workpiece along this guide, a carriage having a drive and a guide, the carriage being capable of longitudinal reciprocations along the guide relative to the workpiece, a rod carrying a spray gun and capable of lateral displacements relative to the workpiece in guides secured on the carriage, wherein the machine has a table secured on the guide of the tailstock, said tailstock having a hole of a size exceeding the cross-sectional dimensions of the table, a drive for imparting reciprocating motion to the rod relative to the workpiece and an arrangement for changing distance the rod can travel along said guide, a rear wall of the chamber having a longitudinally extending slot, the chamber having a gate slidable longitudinally relative to the workpiece and engageable with a hollow pusher which is secured on the carriage and receives the rod, the drive of the carriage and drive for imparting lateral reciprocations to the rod, as well as guides of the carriage and rod, being accommodated at the outer side of the rear wall of the chamber.

4,957,059

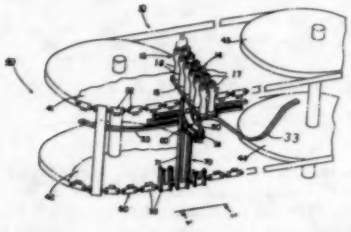
PATTERN CARRIER FOR CONTINUOUS DIPPING

Gary Dunghenbaugh, Canton, Ohio, assignor to ACC Automation, Inc., Akron, Ohio

Filed Apr. 24, 1989, Ser. No. 342,548

Int. Cl.[5] B05C 3/00

U.S. Cl. 118—423 4 Claims



1. In an apparatus for continuously transporting and dipping forms in a process wherein forms of a desired shape are dipped in and coated with a liquid that subsequently forms a thin membrane thereon, the apparatus including an endless roller chain assembly with a uniform pitch that carries a plurality of form carrier assemblies through a linear dipping span, the improvement wherein each form carrier assembly comprises:

vertical track means mounted to said roller chain assembly at a horizontal spacing of at least twice said pitch from adjacent tracks;

a carrier arm slidably connected to said track means for vertical movement therein between a raised position and a lowered dipping position;

means providing horizontal travel of said track;

means responsive to horizontal travel of said track for raising and lowering said carrier arm;

an elongated, generally horizontal form support bar operatively connected to said carrier arm and extending perpendicular to said dipping span of said roller chain assembly; and

a plurality of parallel rows of forms supported in a suspended position from said support bar with their maximum width dimension extending perpendicular to said bar and with the forms of each row being closely spaced to the forms of the adjacent row whereby the rows of forms are transported simultaneously by the same carrier arm.

4,957,060

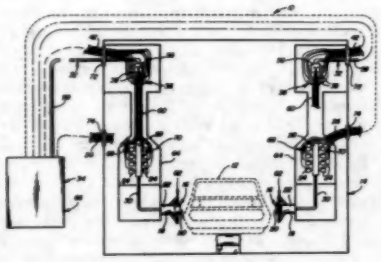
ELECTROSTATIC SPRAY COATING SYSTEM

Roger Cann, Mt. Clemens, Mich., assignor to Behr Industrial Equipment Inc., Rochester, Mich.

Filed Dec. 14, 1988, Ser. No. 284,125

Int. Cl.[5] B05B 5/08, 15/12

U.S. Cl. 118—699 17 Claims



1. A spray coating apparatus (10) for applying a flammable liquid coating material onto a work part (12), said apparatus (10) comprising: spray booth means (14) for containing the sprayed flammable coating material in an isolated zone; discharge means (16) disposed in said spray booth means (14) for discharging the coating material onto the work part (12); a pneumatic valve (24) disposed in said spray booth means (14) for controlling supply of the coating material to said discharge means (16) in response to a pneumatic signal; conduit means (32) extending from an air supply outside said spray booth means (14) to said pneumatic valve (24) for supplying said pneumatic signal to said pneumatic valve (24); control means (34) for controlling the pneumatic signal sent to said pneumatic valve (24); and said control means (34) including intrinsically safe electric valve means (36) in fluid communication with said conduit means (32) and disposed in said spray booth means (14) remote and electrically isolated from said pneumatic valve (24) for alternately preventing and allowing the pneumatic signal to flow through said conduit means (32) to said pneumatic valve (24) solely in response to an electrical signal to said electric valve means (36) to pneumatically signal said pneumatic valve (24).

4,957,061

PLURALITY OF BEAM PRODUCING MEANS DISPOSED IN DIFFERENT LONGITUDINAL AND LATERAL DIRECTIONS FROM EACH OTHER WITH RESPECT TO A SUBSTRATE

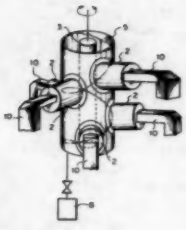
Kenji Ando, Kawasaki; Osamu Kamiya, Machida; Masao Sugata, Yokohama; Noriko Kurihara, Tokyo; Hiroyuki Sugata, Atsugi; Tohru Den, Tokyo; Toshiaki Kimura, Sagamihara; Takashi Hamamoto, Yokohama; Masahiro Haruta, Tokyo, and Kunlji Osabe, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 937,506, Dec. 3, 1986, abandoned. This application Dec. 18, 1989, Ser. No. 453,240

Claims priority, application Japan, Dec. 4, 1985, 60-271328; Dec. 4, 1985, 60-271329; Jul. 15, 1986, 61-164589

Int. Cl.[5] C23C *16/00*

U.S. Cl. 118—719 58 Claims



1. A device for blowing fine particles onto a substrate, the device comprising:

a plurality of means for producing a beam of a flow of fine particles, wherein each said beam producing means is provided with an upstream chamber for dispersing the fine particles in a carrier gas, with said upstream chamber communicating with a pressure-adjusting chamber through a nozzle for jetting out the dispersed fine particles as a beam to a downstream side;

energy imparting means for imparting energy to the substrate, wherein

said beam producing means communicates through each of said pressure-adjusting chambers with a downstream chamber provided therein with a movable substrate, and said plurality of beams produced by said beam producing means being arranged such that each of a plurality of the beams produced by said beam producing means is projected on different portions on the substrate along the moving direction of the substrate, with said plurality of beam producing means being disposed in different longitudinal and lateral directions from each other with respect to the substrate.

4,957,062

APPARATUS FOR PLASMA SURFACE TREATING AND PREPARATION OF MEMBRANE LAYERS

Hubertus J. A. Schuurmans; Jan Werner, both of Amsterdam; Daniel C. Schram, and Gerardus M. W. Kroesen, both of Eindhoven, all of Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed May 9, 1988, Ser. No. 191,502

Int. Cl.[5] C23C *16/50*

U.S. Cl. 118—723 1 Claim

1. Plasma surface treating apparatus for depositing a layer formed from reactants on a substrate surface which comprises:

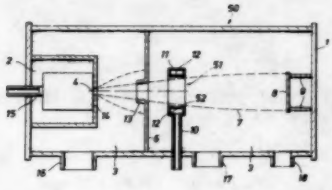
a plasma generation section which is operable at least at substantially atmospheric pressure to generate a high temperature plasma by means of a cascaded arc, said section including an anode having a nozzle-shaped opening defined therethrough; and

an enclosed plasma treating section which is operable at a lower pressure than the plasma generation section, said plasma treating section including:

rim-shaped skimming means located adjacent said nozzle-shaped opening for directing a plasma beam toward said substrate surface which is to be treated with said plasma beam;

material support means to support said substrate;

fluid reactant inlet means located between said rim-shaped skimming means and said material support means, said inlet means including annular shaped distribution means for contacting fluid reactants with said plasma beam, said annular distribution means having an annular inner wall shaped to define a central opening through said inlet



means, said annular wall positioned about the path of flow of said plasma beam, said annular distribution means spaced a distance greater than the thickness of said rim-shaped skimming means away from said nozzle-shaped anode; and

pumping means placed in fluid communication with said plasma treating section for causing said plasma to exhibit supersonic behavior by sufficient withdrawl of gases from said plasma treating section, said plasma beam sequentially passing through said nozzle-shaped anode, said rim-shaped skimming means, said annular shaped distribution means, and thereafter impinging said substrate surface for depositing said layer formed from said reactants.

4,957,063

ODOR CONTROL ANIMAL LITTER

Fred A. Heitfeld, Castro Valley, and Randy L. Wood, San Ramon, both of Calif., assignors to The Clorox Company, Oakland, Calif.

Filed Jul. 25, 1988, Ser. No. 223,502

Int. Cl.[5] A01K *1/015*

U.S. Cl. 119—1 11 Claims

1. An odor control animal litter comprising: particles of an absorbent litter substrate, said particles being contacted with an odor-controlling-effective amount of a guanidine salt.

4,957,064

OFFSHORE FISH CAGE FOR FARMING FISH

Norihiko Koma, Tokyo, Japan, assignor to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 11, 1988, Ser. No. 167,316

Claims priority, application Japan, Mar. 13, 1987, 62-56715

Int. Cl.[5] A01K *61/00*

U.S. Cl. 119—3 10 Claims

1. An offshore fish cage for farming fish comprising:

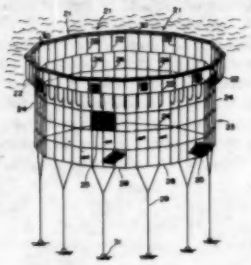
a polygonal frame floating on a water surface composed of a multiplicity of frame elements;

an upper net hung down from the frame and having a length of slack equal to or more than the distance said frame is caused to move up and down by waves;

a lower net having a top end and a bottom end, the lower net composed of a side net fixed to the upper net and a bottom

portion joined to the bottom end of the side net, an opening being provided at the top end of the lower net;

underwater floats fitted to the side net; and



mooring wires mooring the bottom end of the lower net to the bottom of the sea.

4,957,065

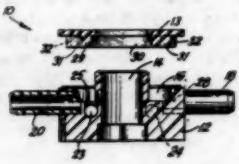
PULSATION SELECTOR

Clayton Neff, Shawnee, and Mofazzal H. Chowdhury, Lenexa, both of Kans., assignors to Alfa-Laval Agri Inc., Kansas City, Mo.

Continuation-in-part of Ser. No. 180,526, Apr. 12, 1988, abandoned. This application Oct. 19, 1989, Ser. No. 423,985

Int. Cl.[5] A01J *5/10*

U.S. Cl. 119—14.37 **8 Claims**



1. A pulsation selector for milking machines which comprises a housing, a connecting chamber in said housing around the circumference of said housing, a plurality of outlet tubes arranged around said housing and communicating with said chamber, two inlet tubes connecting to said chamber on opposite sides of said housing, and a closure for said chamber, said closure having a partition extending into and across said chamber dividing said chamber into two sections, one section connecting one of said inlet tubes to certain of said outlet tubes and the other section connecting the other inlet tube to others of said outlet tubes, said closure and its partition being rotatable, thereby to connect said inlet tubes to different sets of outlet tubes.

4,957,066

FAN ASSEMBLY FOR AN EGG INCUBATOR ENCLOSURE OR A HATCHING ENCLOSURE

Pierre Dambre, Chalonnes-sur-Loire, France, assignor to Elevage Avicole de la Bohardiere, Chalonnes-sur-Loire, France

Filed Oct. 25, 1988, Ser. No. 262,429

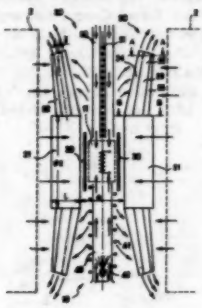
Claims priority, application France, Oct. 27, 1987, 87 14846

Int. Cl.[5] A01K *41/02*

U.S. Cl. 119—39 **10 Claims**

1. A fan assembly for an egg incubator enclosure or for a hatching enclosure, in which a centrifugal fan establishes a pressure reduction and thereby sets up a flow of air through egg storage boxes disposed in near the fan, wherein the centrifugal fan comprises two turbines mounted on a horizontal axis and placed face to face on either side of a vertical central plane disposed substantially in the middle of the enclosure, with the boxes placed on either side of the fan and with each turbine being constituted by a ring which is hollow in the center and provided with blades around its periphery;

and wherein each said blade has a transverse cross-section comprising a central web having an inside edge at its end



oriented towards said central plane and an outside edge at its opposite end, each of said edges having a V-shape, with its apex adjacent said central web and opening outwardly therefrom for producing within the hollow ring a region of reduced pressure, thereby sucking in an axially oriented direction the air from the boxes, and for expelling the air so sucked along said blades, in a radially outwardly oriented direction.

4,957,067

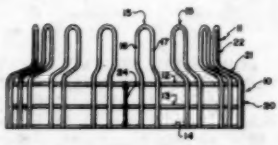
FEEDER FOR ANIMALS

Edward A. Akins, Box 158, Winnipeg, Manitoba, Canada (R2H 3B4)

Filed Jun. 3, 1989, Ser. No. 375,262

Int. Cl.[5] A01K *1/10, 5/00*

U.S. Cl. 119—60 **20 Claims**



1. A feeder for receiving a large cylindrical bale for distributing the bale to a number of animals, comprising an outer frame portion shaped to rest upon the ground and to define a band surrounding the bale and having an upper edge at which the outer frame terminates and a plurality of elongate frame members each connected to the outer frame and each having a first portion extending therefrom inwardly toward the bale and a second portion extending from the first portion upwardly to a height above the upper edge of the outer frame portion.

4,957,068

LIQUID-COOLED FOUR-VALVE CYLINDER HEAD FOR A MULTI-CYLINDER INTERNAL COMBUSTION ENGINE

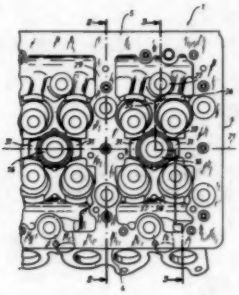
Wolf-Dietrich Wagner, Stuttgart; Willi Springer, Göppingen; Ludwig Meissner, Reichenbach; Helmut Bonfert, Böblingen; Michael Böttcher, Stuttgart; Thomas Hardt, Ostfildern; Rolf Klumpp, Kernen; Klaus Krause, Markgröningen; Arndt Peters, Weinstadt; Ernst Plattner, Mannheim; Wolfgang Strobel, Remshalden; Wolfgang Waller, Stuttgart, and Günter Wiemann, Oppenweiler, all of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany

Filed Jun. 8, 1989, Ser. No. 363,150

Claims priority, application Fed. Rep. of Germany, Jun. 9, 1988, 3819655

Int. Cl.[5] F01P *3/02*

U.S. Cl. 123—41.82 R 10 Claims



1. Liquid-cooled four-valve cylinder head for a multi-cylinder internal combustion engine having a casting comprising:

a. a cooling-fluid space limited by outer walls, a cylinder-head bottom, and a cylinder-head ceiling spaced at a distance from the cylinder-head bottom;

b. valve channels, each having valve channel walls, for each cylinder, each of the valve channels passing through the cooling-fluid space and extending from combustion space portions of the cylinder head bottom to the outer walls;

c. a tubular chamber extending cylindrically, axially between the valve channels for receiving at least one of a spark plug, an injection nozzle and an injection nozzle with a prechamber, the chamber being directly connected to the valve channel walls of the valve channels within the cooling-fluid space;

d. a control space, above the cooling-fluid space, enclosed by the cylinder-head ceiling and the outer walls, extending to a cover plane;

e. two guide housings combined by a bridging member in the manner of spectacles arranged on both sides of a longitudinal mid-plane of each cylinder, and having guide bores for receiving cup tappets, the guide housings extending through the control space;

f. transverse booms extending between the combustion space portions of the cylinder head, intermediate portions of the transverse booms being connected to one another in a longitudinal direction of the cylinder head solely by the guide housings; and

g. supporting struts, positioned at a region of the longitudinal mid-plane of each cylinder, each supporting strut connecting one of the transverse booms to the cylinder-head ceiling and the cylinder-head bottom and having ribs which project outwardly from a longitudinal axis thereof.

4,957,069

DRIVING OR WORKING ENGINE, IN PARTICULAR AN INTERNAL COMBUSTION ENGINE

Gerhard Mederer, Kellerstrasse 7, D-8501 Allersberg, Fed. Rep. of Germany

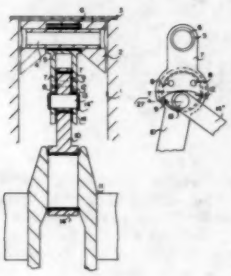
PCT No. PCT/EP88/00367, § 371 Date Jan. 5, 1989, § 102(e) Date Jan. 5, 1989, PCT Pub. No. WO88/08922, PCT Pub. Date Nov. 17, 1988

PCT Filed May 3, 1988, Ser. No. 299,357

Claims priority, application Fed. Rep. of Germany, May 8, 1987, 3715391; Aug. 17, 1987, 87111871

Int. Cl.[5] F02B *75/32*

U.S. Cl. 123—48 B 11 Claims



1. An engine having a housing comprising:

at least one cylinder;

a piston for moving axially within said cylinder;

a crankshaft;

a multi-piece connecting rod having an upper section and a lower section;

said piston being connected to the crankshaft by the upper section of said connecting rod;

a common hinge having a central axis for connecting the lower section of the connecting rod to said upper section;

an adjustable pivot for connecting said upper and lower connecting rod sections with the engine housing through a pivoting lever attached to said hinge;

said upper section having a lower portion, said lower portion of the upper section of the connecting rod carrying an axial extension;

said axial extension extending axially beyond the common hinge central axis towards said lower section;

said pivoting lever having a first end and a second end, said first end joined to said common hinge in an articulated manner, and said second end being supported by an eccentric pivot; and

a plate having said eccentric pivot eccentrically placed thereon and said plate rigidly and adjustably attached to the engine housing.

4,957,070

ENGINE AIR-FUEL INTAKE TRIPLE MANIFOLD

Lawrence E. Ofria, Northridge, and Francis R. Lyndhurst, Costa Mesa, both of Calif., assignors to Thunder Power, Inc., Redondo Beach, Calif.

Filed Dec. 5, 1989, Ser. No. 445,290

Int. Cl.[5] F02M *35/10*

U.S. Cl. 123—52 MB 13 Claims

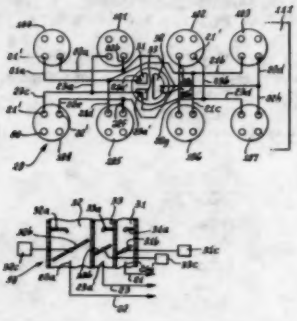
1. In an internal combustion engine having cylinders and a carburetor defining barrel means, each cylinder having two fuel/air intake ports, the combination comprising

(a) a first manifold runner system having a fuel/air intake end communicating with first barrel means of the carburetor, and a fuel/air delivery end or ends communicating

with one of the fuel/air intake ports at each of certain engine cylinders, and

(b) a second manifold runner system having a fuel/air intake end communicating with second barrel means of the carburetor, and a fuel/air delivery end or ends communicating with fuel/air intake ports at each cylinder,

(c) the first manifold runner system serving less than all of the engine cylinders, and the second manifold runner system serving all of the engine cylinders.



4,957,071

INTAKE SYSTEM FOR V-TYPE INTERNAL COMBUSTION ENGINE

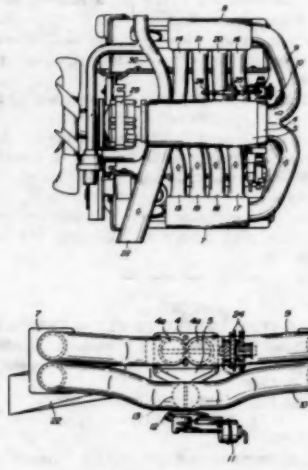
Isuya Matsuo, Yokohama; Suehiro Urabe, Fujisawa, and Eiichi Fujisawa, Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd.

Filed Jul. 25, 1989, Ser. No. 384,610

Claims priority, application Japan, Jul. 26, 1988, 63-97892[U]; Jul. 26, 1988, 63-97893[U]

Int. Cl.[5] F02M *35/00*

U.S. Cl. 123—52 MV **10 Claims**



1. An intake system for a V-type internal combustion engine having first and second banks, comprising:

first and second sub-collectors disposed above the first and second banks, respectively, each sub-collector defining thereinside an air flow chamber which is in fluid communication with cylinders in the banks of the engine;

a main collector disposed above and between the first and second banks, said main collector defining thereinside an air flow chamber in fluid communication with each sub-collector air flow chamber; and

a throttle device through which intake air flows from said main collector to said first and second sub-collectors, said throttle device being disposed at rear end side of the engine and arranged to control air flow from said main collector to said first and second sub-collectors.

4,957,072

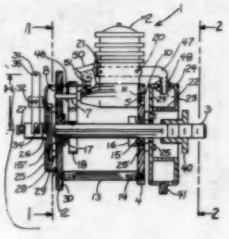
BALANCED RADIAL ENGINE

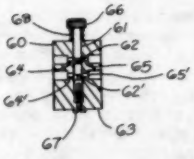
Michael P. Goldowsky, 7 Greenwood La., Valhalla, N.Y. 10595

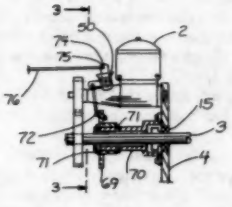
Continuation-in-part of Ser. No. 276,943, Nov. 28, 1988. This application May 15, 1989, Ser. No. 334,600

Int. Cl.[5] F02B *75/22*

U.S. Cl. 123—55 A **16 Claims**







1. A gravity flow fuel delivery system for multi-carburetor engines that provides a single fuel mixture adjustment for all carburetors and compensates for fuel head elevation differences between carburetors, incorporating a plurality of fuel tank means with relative elevation differences corresponding to the elevation differences of the respective carburetors to be pressure head compensated, said individual fuel tank means each having outlet conduits that introduce fuel to an individually isolated inlet port of a single hydraulic valve, said valve possessing a single adjustment means and at least one isolated

outlet port means matched to a respective one of said inlet ports for each fuel tank means, said valve producing equal and adjustable flow resistances due to movement of said single adjustment means between all the respective inlet and outlet port means in the valve thereby producing equal flow rates from each tank means.

4,957,073

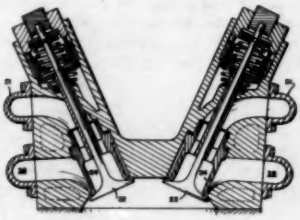
MULTIPLE CONCENTRIC INTAKE/EXHAUST VALVE SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Charles W. Bergeron, 7694 Little John Dr., Apt. #10, Indianapolis, Ind. 46219

Continuation of Ser. No. 363,335, Jun. 8, 1989, abandoned, which is a continuation of Ser. No. 205,620, Jun. 2, 1988, abandoned, which is a continuation of Ser. No. 312,871, Nov. 19, 1981, abandoned. This application Feb. 6, 1990, Ser. No. 474,685

Int. Cl.[5] F01L *1/28*; F02M *35/10*

U.S. Cl. 123—79 C 10 Claims



4. An intake and exhaust valve system deployed in a four stroke, internal combustion engine for improving intake and exhaust charge volume per unit time in each cylinder comprising:

at least three concentric intake and exhaust valve assemblies, each assembly having a separate poppet intake valve and intake valve seat and a separate cylindrical exhaust valve and exhaust valve seat, said intake valve being concentrically disposed relative to said exhaust valve, mounted in fluid communication with each engine cylinder;

means for opening said intake valves coupled to said intake valves;

means for opening said exhaust valves coupled to said exhaust valves;

intake valve spring connected to each intake valve for closing each intake valve independently;

exhaust valve spring connected to each exhaust valve for closing each exhaust valve independently;

said intake valves each having a diameter size substantially equal to each other and strategically selected such that the sum total of the circumferences of the first, second, and third intake valves exceed the circumference of the combustion chamber;

whereby the available intake valve opening area of the combustion chamber is a function o the sum total of the circumferences of each intake valve multiplied by the valve lift height for a predetermined time to provide optimum charge density for maximum volumetric efficiency.

4,957,074

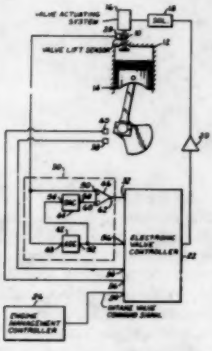
CLOSED LOOP ELECTRIC VALVE CONTROL FOR I. C. ENGINE

Harold E. Weissler, II; Robert E. Weber, and Russell J. Wakeman, all of Newport News, Va., assignors to Siemens Automotive L.P., Troy, Mich.

Filed Nov. 27, 1989, Ser. No. 441,790

Int. Cl.[5] F01L *9/04*

U.S. Cl. 123—90.11 6 Claims



1. In an internal combustion engine having one or more solenoid-controlled valves that are operated to open and close combustion chambers in variable phasing to engine crankshaft rotation, said engine also having an electronic management controller for issuing commands for various engine functions including command of the phasing of said solenoid-controlled valves in relation to engine crankshaft rotational position, the improvement comprising a closed loop control system for the closed loop control of the phasing of said solenoid-controlled valves, said system comprising an electronic valve controller having multiple input means and output means, a lift sensor for each of said valves for sensing valve lift, a lift sensor processing circuit for each lift sensor for coupling the corresponding lift sensor with a corresponding one of said electronic valve controller input means, means providing to another of said electronic valve controller input means real time information about current crankshaft rotational position in relation to a known reference, means supplying from said electronic management controller to a further one of said electronic valve controller input means a command for the phasing of said solenoid-controlled valves, a driver circuit for each of said valves for coupling the corresponding controlling solenoid with a corresponding one of said electronic valve controller output means, said electronic valve controller comprising means for closed loop controlling, by means of the corresponding lift sensor and lift sensor processing circuit, each solenoid-controlled valve to operate under the command delivered from said electronic management controller to said further one of said input means, and each lift sensor processing circuit comprising means for processing information from the corresponding lift sensor to disclose to said electronic valve controller, as the corresponding valve operates, the actual opening and closing of the valve, wherein said means for processing information includes a means to accurately re-calibrate the lift sensor each time before the valve opens.

4,957,075

APPARATUS FOR CONTROLLING INLET OF EXHAUST VALVES

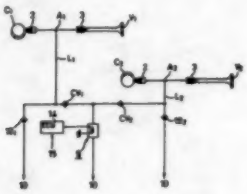
Shunpei Hasegawa, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 145,479, Jan. 19, 1988, abandoned. This application Sep. 5, 1989, Ser. No. 403,852

Claims priority, application Japan, Jan. 19, 1987, 62-8099

Int. Cl.[5] F01L *1/00*

U.S. Cl. 123—90.12 **3 Claims**



1. In an apparatus for hydraulically controlling inlet or exhaust valves of a multiple-cylinder engine having sealed hydraulic chambers and solenoid valve means that open and close to connect and disconnect the hydraulic chambers with a hydraulic low-pressure source, each hydraulic chamber having a first plunger driven by a cam and a second plunger for actuating an inlet or exhaust valve, the improvement comprising said solenoid valve means comprising a single solenoid valve having a plurality of passages connected separately to a like plurality of hydraulic chambers, a one-way valve disposed in each passage between the associated hydraulic chamber and said single solenoid valve to permit fluid flow in a direction from said associated hydraulic chamber to said single solenoid valve but to prevent flow from any of the other hydraulic chambers of said plurality of hydraulic chambers;

said solenoid valve means comprising control means including a hydraulically-operated main valve operative in said hydraulic chambers to control the fluid pressure therein and said solenoid valve being a pilot valve operatively associated with said main valve to actuate said main valve to effect fluid flow from said hydraulic chambers in response to actuation of said solenoid valve; and

each said hydraulic chamber being connected to said low pressure oil source through another one-way valve for adding oil to the hydraulic chamber as needed when the hydraulic chamber is at a pressure lower than said low pressure oil source.

4,957,076

VALVE OPERATING MECHANISM FOR AN INTERNAL COMBUSTION ENGINE

Kazuo Inoue; Takashi Hanaoka, and Tsuneo Konno, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 39,111, Apr. 15, 1987, abandoned. This application Feb. 3, 1989, Ser. No. 306,220

Claims priority, application Japan, Apr. 16, 1986, 61-86072; Jul. 4, 1986, 61-157488; Oct. 13, 1986, 61-242675

Int. Cl.[5] E01L *1/00*

U.S. Cl. 123—90.16 **23 Claims**

1. A valve operating mechanism for an internal combustion engine having a valve disposed in an intake port or an exhaust port of a combustion chamber, cam means rotatable in synchronism with a crankshaft, cam follower means for operably connecting said cam means to said valve, means for selectively operably connecting said cam means to said valve for varying the mode of operation of said valve according to variable engine operating conditions, said valve operating mechanism comprising:

spring means for applying a biasing force on said valve in opposition to said cam follower means;

means responsive to a first engine operating characteristic for changing the operation of said cam follower means for varying said mode of valve operation; and

means responsive to a second engine operating characteristic for varying the biasing force on said valve, wherein said cam follower means includes a cam follower engaging said cam, and said spring means includes an auxiliary spring means urging said cam follower in a direction to be pressed against said cam.

4,957,077

CAMSHAFT DRIVING ARRANGEMENT FOR DOUBLE OVERHEAD CAMSHAFT ENGINE

Nobuyuki Okitsu; Masaru Mitsuhashi, both of Yokohama, and Yoshio Iwasa, Nagareyama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Dec. 14, 1989, Ser. No. 450,696

Claims priority, application Japan, Dec. 21, 1988, 63-320594

Int. Cl.[5] F01L *1/02*

U.S. Cl. 123—90.31 **5 Claims**

1. In a DOHC engine having a cylinder block including two cylinder banks angularly disposed to each other, two cylinder heads mounted on the two cylinder banks, respectively, two pairs of camshafts, each pair being rotatably mounted to one of the two cylinder heads, and a crankshaft mounted to the cylinder block, a camshaft driving arrangement comprising:

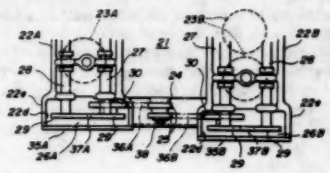
two pairs of cam sprockets, each pair being mounted to each of the camshafts at one end thereof;

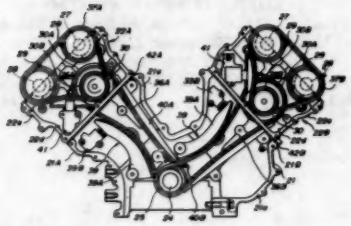
two idler gears, each being rotatably mounted to one of the cylinder heads;

a first camshaft driving chain drivingly interconnecting one of said idler gears and the adjacent pair of said cam sprockets;

a second camshaft driving chain drivingly interconnecting the other of said idler gears and the other pair of said cam sprockets, said first and second camshaft driving chains

having different running planes which are axially spaced along the axis of the crankshaft; and





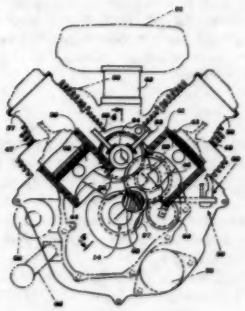
means for drivingly interconnecting the crankshaft and said idler gears.

4,957,078

V-TYPE MULTI-CYLINDER ENGINE

Tsuyoshi Ohkawa, and Reiichi Kaji, both of Iwata, Japan, assignors to Yamaha Katsudoki Kabushiki Kaisha, Iwata, Japan

Filed Jul. 19, 1989, Ser. No. 382,093
Claims priority, application Japan, Jul. 22, 1988, 63-181478
Int. Cl.[5] F01L *1/02*
U.S. Cl. 123—90.31 **22 Claims**



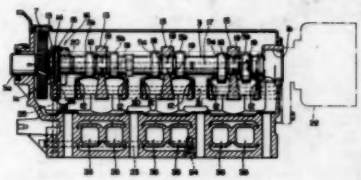
1. An internal combustion engine having a cylinder, a crankshaft at one end of said cylinder rotatably driven from a piston reciprocating in said cylinder, a camshaft rotatable about an axis offset from the axis of rotation of said crankshaft, cam means on said camshaft for operating a valve associated with said cylinder, an intermediate shaft journaled for rotation about an axis parallel to and offset from said crankshaft and said camshaft axes, a first pair of gears comprising a gear fixed for rotation with said crankshaft and a gear meshed therewith and affixed for rotation with said intermediate shaft for driving said intermediate shaft from said crankshaft, and a second pair of gears comprising a gear fixed for rotation with said intermediate shaft and a gear meshed therewith and fixed for rotation with said camshaft for driving said camshaft from said intermediate shaft, said first pair of gears and said second pair of gears each having a ratio other than unity and other than one-half to one with the overall ratio of rotation of said camshaft to said crankshaft being one-half to one.

4,957,079

CAMSHAFT STRUCTURE FOR DOUBLE OVERHEAD CAMSHAFT ENGINE

Shigeki Nakatani; Naohide Koshimoto, and Hiroyuki Sugimoto, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Nov. 29, 1989, Ser. No. 442,794
Claims priority, application Japan, Dec. 3, 1988, 63-306285
Int. Cl.[5] F01M *9/10*
U.S. Cl. 123—90.34 **8 Claims**



1. An overhead camshaft structure for a double overhead camshaft internal combustion engine comprising a cylinder block formed with a series of at least three cylinders, a cylinder head and two overhead camshafts formed with a series of cams and a series of camshaft bearing journals for said at least three cylinders, said two overhead camshafts being operatively connected with each other by means of helical gears connected to said two overhead camshafts, respectively, said overhead camshaft structure comprising:

a circular thrust collar formed on each said overhead camshaft;

a thrust bearing comprising upper and lower halves for supporting each said overhead camshaft therebetween, said thrust bearing including a thrust restrictive groove having an upper half formed in said upper half of said thrust bearing and a lower half formed in said lower half of said thrust bearing for receiving therein said circular thrust collar, said upper half of said thrust restrictive groove being wider than said lower half of said thrust restrictive groove; and

an oil passage comprising a radial passage portion extending in parallel with a diameter of said circular thrust collar and opening in a periphery of said circular thrust collar and an axial passage portion formed in each said overhead camshaft along its length for allowing lubricating oil to pass up to each said camshaft bearing journal, said radial passage being directed in parallel with a straight line connecting an axial centerline of rotation of each said overhead camshaft and a juncture between a valve opening ramp of a cam lobe and a cam base of said cam.

4,957,080

ENGINE PROTECTION SYSTEM

Mark W. Howland, 6198 Fireside La., Allenton, Wis. 53002

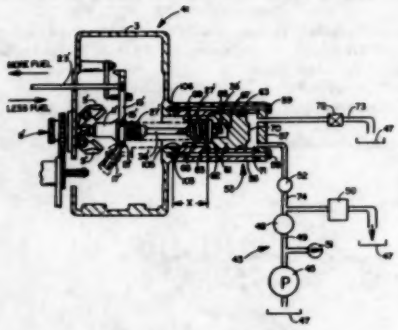
Filed Aug. 30, 1988, Ser. No. 238,178
Int. Cl.[5] F02M *39/00*
U.S. Cl. 123—198 D **23 Claims**

1. Apparatus useful for protecting an internal combustion engine having a governor with a housing secured to the engine and a lubrication oil system against failure due to insufficient lubrication oil pressure comprising:

(a) cylinder means for fixedly mounting to and being immo-

bile relative to the engine governor housing and for tapping into the engine lubrication oil system; and

(b) piston means received within the cylinder means for cooperating therewith to define a cylindrical chamber for receiving a portion of the engine lubrication oil and for sliding within the cylinder means between first and second positions, the piston means having a bearing face contactable by the governor, the piston means being slidable to



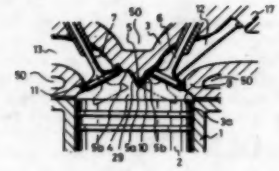
the first position against the governor when a predetermined lubrication oil pressure is present in the chamber to permit the governor to control the engine to a running condition, the piston means being slidable by the governor to the second position free of any force that resists sliding of the piston means to the second position when a lubrication oil pressure less than the predetermined lubrication oil pressure is present in the chamber to thereby cause the governor to control the engine to a shut down condition.

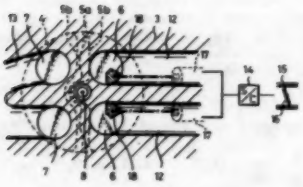
4,957,081

COMBUSTION CHAMBER OF AN ENGINE

Toshio Ito, and Toshio Tanahashi, both of Susono, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Aug. 14, 1989, Ser. No. 393,404
Claims priority, application Japan, Aug. 30, 1988, 63-213648
Int. Cl.[5] F02B *31/00*
U.S. Cl. 123—302 **21 Claims**





1. An engine comprising:

an engine body including a cylinder head having an inner wall;

a piston reciprocally movable in said engine body, the inner wall of said cylinder head and a top face of said piston defining a combustion chamber therebetween;

valve means arranged on the inner wall of said cylinder head; and

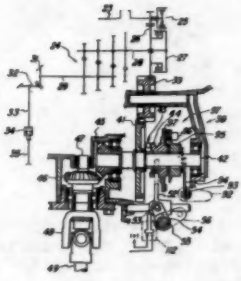
a masking wall formed on the inner wall of said cylinder head to mask a part of a valve opening formed between a valve seat and a peripheral portion of said valve means, said valve seat and said masking wall being formed by a built-up layer which is built up on said cylinder and is machined, said built-up layer comprising a copper-based metallic material containing nickel, iron, and phosphorus, said metallic material being different from that of said cylinder head.

4,957,082

VEHICLE CONTROL SYSTEM

Akira Takayama, Fukuroi, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Mar. 31, 1986, Ser. No. 846,567
Int. Cl.[5] F02D *9/00, 31/00*
U.S. Cl. 123—334 **14 Claims**



1. In a governor for an internal combustion engine having a shaft driven by said engine, and governor means driven by said engine for controlling the speed of said engine by operation of a first control system of said engine, the improvement comprising means for detecting the speed of said shaft and means for retarding the speed of said engine through operation of a second control system of said engine if said detecting means senses an over speed condition.

4,957,083

FUEL SUPPLY CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE WITH FEATURE PROVIDING ENGINE STABILITY IN LOW ENGINE LOAD CONDITION

Shinpei Nakaniwa, and Naoki Tomisawa, both of Gunma, Japan, assignors to Japan Electronic Control Systems Company, Limited, Isezaki, Japan

Filed Oct. 5, 1988, Ser. No. 253,532
Claims priority, application Japan, Oct. 12, 1987, 62-254678
Int. Cl.[5] F02D *41/04*
U.S. Cl. 123—436 **13 Claims**

1. A fuel supply control system for controlling an amount of fuel to be delivered to an internal combustion engine, cc nprising:

a sensor means for monitoring preselected engine driving condition indicative parameters including an intake air pressure and an engine speed;

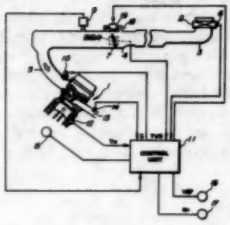
a first detector means for detecting a predetermined stable engine driving condition at an engine load condition lower than a predetermined value to produce a first detector signal;

a second detector means for detecting an engine speed variation rate to produce a second detector signal when the

engine speed variation rate is smaller than a predetermined value;

a first arithmetic means for deriving a basic fuel supply amount on the basis of said intake air pressure;

a second arithmetic means for projecting an intake air flow rate data on the basis of said engine speed and said basic fuel supply amount under the presence of said first and second detector signals;



a third arithmetic means for deriving said basic fuel supply amount on the basis of said engine speed and said projected intake air flow rate data under the presence of said first detector signal and the absence of said second detector signal, said first arithmetic means being otherwise operable to derive said basic fuel supply amount; and

a controlling means for deriving a fuel supply control signal based on said basic fuel supply amount for controlling fuel supply for said engine.

4,957,084

FUEL INJECTION APPARATUS FOR INTERNAL COMBUSTION ENGINES

Manfred Krämer, Schwieberdingen, and Erhard Sitter, Horb, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

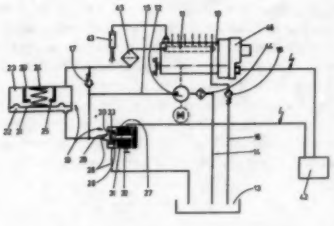
PCT No. PCT/DE87/00288, § 371 Date Oct. 13, 1988, § 102(e) Date Oct. 13, 1988, PCT Pub. No. WO88/00292, PCT Pub. Date Jan. 14, 1988

PCT Filed Jun. 25, 1987, Ser. No. 272,887

Claims priority, application Fed. Rep. of Germany, Jul. 5, 1986, 3622626; Jun. 16, 1987, 3720067

Int. Cl.[5] F02M *39/00*

U.S. Cl. 123—447 **12 Claims**



1. A fuel injection apparatus for internal combustion engines, particularly diesel internal combustion engines having injection nozzles and a fuel injection pump with a suction chamber for communicating fuel from the suction chamber to the injection nozzles, said fuel injection apparatus comprising:

a fuel delivery pump for communicating fuel from a fuel tank to the suction chamber of the fuel injection pump;

a return line for communicating the suction chamber of the fuel injection pump with the fuel tank;

an overflow valve located in said return line for limiting pressure in the suction chamber; and

a cut-off device located downstream of said delivery pump and upstream of the fuel injection pump, said delivery pump having an outlet, said cut-off device comprising an inlet valve located upstream of the suction chamber of the fuel injection pump and having an open position in which it communicates said outlet of said delivery pump with the suction chamber, a spring-loaded accumulator including a storage chamber communicating with said outlet of said delivery pump, a spring chamber communicating with the suction chamber of the injection pump, a spring located in said spring chamber for loading said accumulator, a fuel bypass line communicating said outlet of said delivery pump with the fuel tank, and a control valve located in said bypass line for communicating said outlet of said delivery pump with the fuel tank upon actuation of said cut-off device.

4,957,085

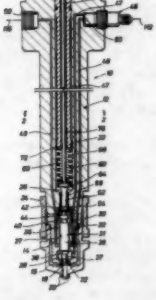
FUEL INJECTION SYSTEM FOR INTERNAL COMBUSTION ENGINES

Anatoly Sverdlin, 1847 Raintree Cir., Seabrook, Tex. 77586

Filed Feb. 16, 1989, Ser. No. 311,626

Int. Cl.[5] F02M *39/00*

U.S. Cl. 123—467 **46 Claims**



1. An improved fuel injector adapted for use with a fuel injection system for a multi-cylinder internal combustion engine including a control fluid pressure source and a pressurized fuel source; said fuel injector comprising:

an elongate body having a bore therein;

a fuel nozzle at an inner end of said body for projecting within an associated cylinder combustion chamber for delivery of fuel therein, a fuel chamber adjacent the fuel nozzle and having pressurized fuel therein, and a valve seat between the fuel nozzle and fuel chamber;

a valve mounted within said bore on said valve seat and movable between open and closed positions relative to said valve seat and said nozzle, said valve being in communication with pressurized fuel in said fuel chamber and urged toward an open unseated position by said pressurized fuel for providing fuel to said nozzle for discharge into an associated cylinder;

a pressurized control fluid chamber in said body adjacent said valve and having pressurized control fluid therein for urging said valve toward a closed seated position on said valve seat to block the flow of fuel to said nozzle under a primary fluid control mode of operation;

a mechanical mode spring in said body operable upon the decrease in pressure of said control fluid below a predetermined minimum amount for urging said valve toward a

seated closed position on said valve seat, said mechanical mode spring comprising a compression spring acting against the outer end of said valve for urging said valve toward a seated position; and

means to maintain said mechanical mode spring in an inoperable position during the primary fluid control mode of operation;

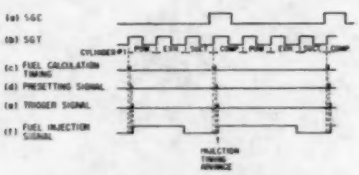
said bore of said body including a guideway in which said valve is mounted for longitudinal movement between seated and unseated positions relative to said valve seat, said control fluid chamber being positioned adjacent the outer end of said guideway with pressurized control fluid therein providing a fluid seal between said valve and said guideway, and cushioning the movement of said valve to an unseated open position.

4,957,086

FUEL CONTROLLER FOR AN INTERNAL COMBUSTION ENGINE

Takeo Sasaki, and Yoshiaki Kanno, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 17, 1989, Ser. No. 311,788
Claims priority, application Japan, Feb. 18, 1988, 63-36057
Int. Cl.[5] F02D *41/04*
U.S. Cl. 123—478 **11 Claims**



1. A fuel supply controller for an internal combustion engine comprising:

a fuel injector which supplies fuel to a cylinder of an engine;

detecting means for detecting the operating state of the engine; and

a control unit including calculating means for calculating the appropriate amount of fuel to be supplied to the engine based on the detected engine operating state, fuel injector control means for driving said fuel injector subsequent to the fuel amount calculation for the length of time adequate to supply the calculated amount of fuel to the cylinder, and timing advance means for simultaneously advancing the start of fuel injection by said fuel injector by a prescribed amount and advancing the fuel amount calculation by substantially the same amount when the detected engine operating sate satisfies a prescribed condition so that a time delay between the fuel amount calculation and the fuel injection is substantially constant.

4,957,087

APPARATUS FOR CONTROLLING ENGINE OPERABLE ON GASOLINE/ALCOHOL FUEL BLEND

Tadaki Ota, Fujisawa, Japan, assignor to Nissan Motor Company, Ltd., Japan

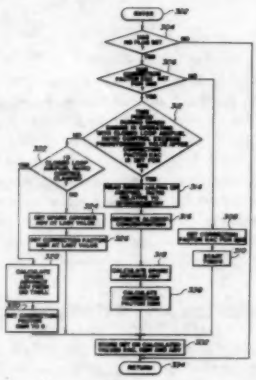
Filed Oct. 11, 1989, Ser. No. 421,566
Claims priority, application Japan, Oct. 11, 1988, 63-253714
Int. Cl.[5] F02D *41/04, 41/22*
U.S. Cl. 123—479 **6 Claims**

1. An apparatus for use with an internal combustion engine operable on either of gasoline fuel and gasoline/alcohol fuel blend, comprising:

an alcohol concentration sensor sensitive to an alcohol concentration of the fuel to be delivered to the engine for producing an alcohol concentration signal indicative of a sensed alcohol concentration;

an oxygen sensor sensitive to an oxygen content of exhaust gases discharged from the engine for producing an air/fuel ratio feedback signal; and

a control unit coupled to the alcohol concentration sensor and the oxygen sensor for controlling the amount of fuel metered to the engine and the timing of ignition at the engine, the control unit including means responsive to the air/fuel ratio feedback signal for calculating a difference of the air/fuel ratio from a stoichiometric value, first means for calculating a first value for the amount of fuel metered to the engine based on engine operating conditions, second means for calculating a second value for the ignition timing based on engine operating conditions for the sensed alcohol concentration, third means for correcting the calculated first value for the sensed alcohol concentration, fourth means for correcting the calculating first value to provide fuel enrichment during high engine load conditions, fifth means for correcting the calculated first value based on the calculated air/fuel ratio difference



to provide a closed loop air/fuel ratio control, sixth means responsive to failure in the alcohol concentration sensor for producing a failure signal, and seventh means responsive to the failure signal for forcing the third means to correct the calculated first value for a predetermined alcohol concentration, the seventh means inhibiting the fourth means from providing fuel enrichment while forcing the second means to calculate the second value for the gasoline fuel when the closed loop air/fuel ratio control is clamped after the third means is forced to correct the calculated first value for the predetermined alcohol concentration, the seventh means forcing the fourth means to correct the calculated first value based on the calculated air/fuel ratio difference and the second means to calculate the second value based on the calculated air/fuel ratio difference when the closed loop air/fuel ratio control is in order after the third means is forced to correct the calculated first value for the predetermined alcohol concentration.

4,957,088

FUEL INJECTION CONTROL SYSTEM FOR AN AUTOMOTIVE ENGINE

Hiroshi Hosaka, Mitaka, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 22, 1989, Ser. No. 411,552
Claims priority, application Japan, Oct. 13, 1988, 63-257645
Int. Cl.[5] F02D *41/34*
U.S. Cl. 123—480 **2 Claims**

1. A system for controlling fuel injection of an engine for a motor vehicle having an intake passage, a throttle valve pro-

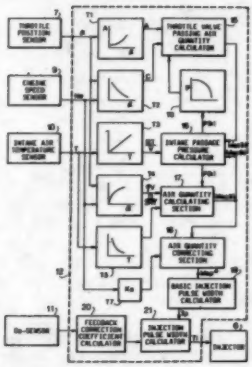
vided in the intake passage, and a fuel injector, the system comprising:

an engine speed sensor for producing an engine speed signal dependent on speed of the engine;

a throttle position sensor for producing a throttle opening degree signal dependent on opening degree of the throttle valve;

an intake air temperature sensor for producing an intake air temperature signal;

storing means for storing various coefficients which are arranged in accordance with the engine speed signal, the throttle opening degree signal and the intake air temperature signal;



first calculator means for calculating a quantity of induced air, using coefficients derived from the storing means in accordance with the engine speed signal, throttle opening degree signal and intake air temperature signal;

correcting means for correcting the induced air quantity calculated by the first calculator means, using a coefficient derived from the storing means in accordance with the engine speed signal and for producing a corrected induced air quantity signal; and

second calculator means for producing a basic injection pulse width signal in accordance with said corrected induced air quantity signal so as to approximate to an actual induced air quantity.

4,957,089

FUEL INJECTION CONTROL SYSTEM FOR A TWO-CYCLE ENGINE

Koji Morikawa, Musashino, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 21, 1989, Ser. No. 383,869

Claims priority, application Japan, Jul. 29, 1988, 63-191121

Int. Cl.[5] F02D *41/34*

U.S. Cl. 123—486 **2 Claims**

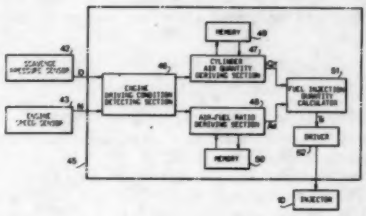
1. A system for controlling quantity of fuel for a two-cycle engine having at least one cylinder, a scavenge port, an exhaust port, an intake passage communicated with said scavenge port, a fuel injector provided for injecting the fuel directly in the cylinder, and a scavenge pump provided in said intake passage for supplying air to the cylinder, the system comprising:

a pressure sensor provided in the intake passage for detecting the pressure of scavenge air delivered by the scavenge pump and for producing a scavenge pressure signal;

an engine speed sensor for detecting engine speed and for producing an engine speed signal;

a first memory storing a plurality of data relative to quantity of intake air in the cylinder excluding quantity of escape air at scavenging the cylinder;

first means for deriving quantity of intake air from the table in accordance with the scavenge pressure signal and with the engine speed signal; and



calculator means for calculating quantity of fuel injected by the fuel injector based on the quantity of intake air induced in the cylinder.

4,957,090

PUMP NOZZLE FOR DIESEL ENGINES

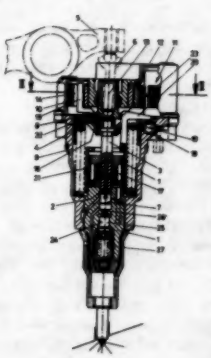
Heinz Rathmayr, Hallein; Maximilian Kronberger, Steyr, and Eugen Drummer, Steyr, all of Austria, assignors to Voest-Alpine Automotive Gesellschaft m.b.h., Linz, Austria

Filed Apr. 3, 1989, Ser. No. 332,173

Claims priority, application Fed. Rep. of Germany, Apr. 8, 1988, 3811796; Apr. 20, 1988, 3813320

Int. Cl.[5] F02M *39/00*

U.S. Cl. 123—501 **7 Claims**



1. In a pump nozzle for a diesel engine, in which an injection pump element including a pump piston which is driven by a cam shaft via a thrust element and a pump element bushing, is combined with an intermittently opened injection nozzle for one motor cylinder, wherein the pump piston is circumferentially surrounded by a control sleeve which is non-rotatable relative to the pump element bushing, and wherein an adjusting means is provided for rotating the pump piston relative to the control sleeve for adjusting the amount of fuel injected for each cycle of opening of the injection nozzle,

the improvement comprising:

said adjusting means is disposed at substantially the same level as the thrust element relative to the longitudinal axis of the pump nozzle;

said control sleeve is disposed completely within a pump spring;

said pump element bushing is formed as an integral member with a blink longitudinal bore which directly receives said pump piston;

said pump spring circumferentially surrounds said pump element bushing throughout a portion of the longitudinal extent of said pump element bushing; and

said pump spring extends from the level of said adjusting means to the level of a working chamber of said pump piston.

4,957,091

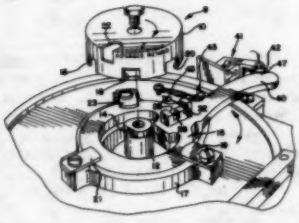
DUAL SCHEDULE IGNITION SYSTEM

Gregry M. Remmers, Ingleside, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Continuation-in-part of Ser. No. 131,457, Dec. 11, 1987, Pat. No. 4,858,585, which is a continuation of Ser. No. 12,336, Feb. 9, 1987, abandoned. This application Feb. 24, 1989, Ser. No. 315,147

Int. Cl.[5] F02P 7/00

U.S. Cl. 123—602 **27 Claims**



1. An ignition system for an internal combustion engine of the type which has an ignition capacitor means, means for charging the ignition capacitor means, and means for discharging the ignition capacitor means in response to trigger pulses, the system comprising:

trigger pulse generating means for producing trigger pulses related to crankshaft position, said trigger pulse generating means being adapted to provide a non-advanced timing characteristic, and an advanced timing characteristic which is advanced a predetermined time with respect to said non-advanced timing characteristic;

said trigger pulse generating means including a time base generator comprising an encoder disk having a generally cylindrical encoding portion and an end support, said end support being connected to the crankshaft of the engine for rotating said encoder disk synchronously therewith, said encoding portion including timing sections of a predetermined width corresponding to a fixed crankshaft angle;

means for sensing the beginning of each timing section and producing a trigger pulse indicative thereof to generate said advanced timing characteristic; and

means for sensing the ending of each timing section and producing a trigger pulse indicative thereof to generate said non-advanced timing characteristic;

whereby the width of said timing sections correspond to the degree of advance of said advanced timing characteristic over said non-advanced timing characteristic;

means for generating either an advanced signal for the selection of said advanced timing characteristic or a non-advanced signal for the selection of said non-advanced timing characteristic based upon at least one operating condition of the engine;

said trigger pulse generating means providing trigger pulses with said advanced timing characteristic in response to said advance signal being applied thereto and providing trigger pulses with said non-advanced timing characteristic in response to said non-advanced signal being applied thereto.

4,957,092

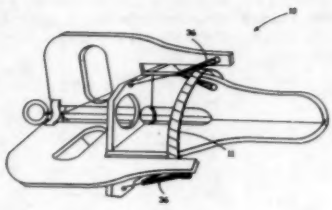
RING LAUNCHING METHOD AND APPARATUS

Richard O. Rhodes, 490 Belvedere St., San Francisco, Calif. 94117

Filed Sep. 8, 1989, Ser. No. 404,826

Int. Cl.[5] F41F 7/00

U.S. Cl. 124—20.1 **25 Claims**



1. An apparatus for launching a ring, comprising:

a frame defining a central longitudinal launching axis for supporting said ring such that said ring is positioned around the frame concentric with said longitudinal axis; and

launching means supported on said frame for simultaneously imparting to said ring a rotational force and a forward, axial force along said longitudinal launching axis, whereby said imparted rotational and axial forces cause said ring to be launched from said frame and advance in a forward direction with inertial stability provided by said rotational motion thereby allowing prolonged and stable progression of said ring in said forward direction;

said launching means including elastic members movable between a relaxed position and a stretched position such that said ring rests against said elastic members when the latter is in said relaxed position and said stretched position, whereby movement of said elastic members from said stretched position to said relaxed position launches said ring.

25. A method of launching a ring from an apparatus comprising a frame defining a central longitudinal launching axis and a plurality of elastic members supported on said frame for holding said ring and for movement between a relaxed position and a stretched position, said method comprising the steps of:

positioning said ring against said elastic members;

stretching said elastic members from said relaxed position to said stretched position and causing it to move back to its relaxed position in a way which imparts to said ring both axial and rotational motion causing said ring to be launched from said frame and advance in a forward direction along said central longitudinal axis with inertial stability provided by said rotational motion thereby allowing prolonged and stable progression of said ring in said forward direction.

4,957,093

COMPOUND BOW HAVING A PISTOL GRIP

Bruce R. Hamlett, 6027 Amadore, Union Lake, Mich. 48085

Continuation-in-part of Ser. No. 134,468, Dec. 17, 1987, abandoned. This application Jul. 19, 1989, Ser. No. 382,732

Int. Cl.[5] F14B 5/00

U.S. Cl. 124—24.1 **28 Claims**

27. In a compound bow for projecting an arrow including first and second tensionable limbs, each limb having first and second end portions, a central body having first and second end portions adapted to support corresponding first end portions of said first and second tensionable limbs in an outwadly extending relationship thereto, a pair of pulleys, one pulley rotatably mounted on said second end portion of each tensionable limb with a bow string extending between said pulleys in

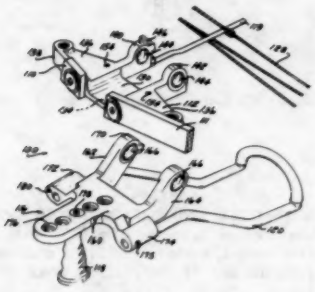
a conventional manner, said first and second tensionable limbs, said central body, and said bow string defining a longitudinal bow plane, a laterally offset portion formed in said central body defining an arrow passage for supporting an arrow having a longitudinal arrow axis disposed in said longitudinal bow plane;

the improvement comprising:

first and second arm portions extending from said central body with said arrow passage interposed between said first and second arm portions, each arm portion having a bearing bore formed therein defining a common longitudinal hinge axis lying in said longitudinal bow plane and intersecting said arrow axis in a perpendicular relationship thereto;

a stop member formed on one of said arm portions projecting laterally beyond an outer surface of said one of said arm portions;

a support member having first and second integral inclined



arms formed thereon, each inclined arm having a bearing bore formed therein alignable in coaxial relationship with said bearing bores of said arm portions of said central body;

a stop projection formed on one of said inclined arms engageable with said stop member for limiting pivotal movement of said support member with respect to said central body;

first and second pivot members for pivotally coupling said support member to said central body such that said arrow passage is unobstructed, said first pivot member coupling said first arm portion to said first inclined arm through said aligned bearing bores, said second pivot member coupling said second arm portion to said second inclined arm through said aligned bearing bores; and

a hand grip member connectable to said support member and having a central longitudinal axis generally normal to said longitudinal bow plane and intersecting said arrow axis in a generally perpendicular relationship thereto.

4,957,094

COMPOUND ARCHERY BOW WITH NON-STRETCH BOWSTRING AND ECCENTRICS FOR SECURING SAME

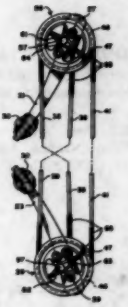
James A. Pickering, Sandy; Joseph R. Johnston, Park City, both of Utah, and Thomas A. Fisher, Prescott Valley, Ariz., assignors to The Hoyt/Easton Archery Company, Inc., Salt Lake City, Utah

Filed Nov. 25, 1987, Ser. No. 125,120

Int. Cl.[5] F14B *5/00*

U.S. Cl. 124—24.1 **36 Claims**

22. An eccentric for use with a compound bow having a handle section and a pair of limbs extending from the handle section to provide a pair of limb tips, comprising a bowstring section; a bowstring receiving groove about the periphery of the bowstring section; a buss cable section adjacent the bowstring section; a buss cable receiving groove about the periphery of the buss cable section; means located inwardly from the buss cable receiving groove for securing a looped end of a buss cable to the eccentric so that a portion of the buss cable so attached will rest in the buss cable receiving groove; means located inwardly from the bowstring receiving groove for



securing a looped end of a bowstring to the eccentric so that a portion of the bowstring so attached will rest in the bowstring receiving groove; and means in the eccentric for receiving an axle for rotatably mounting the eccentric to a limb tip of a compound bow.

4,957,095

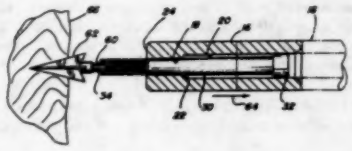
ARCHERY BOW STABILIZER AND EMBEDDED ARROWHEAD REMOVER

Ronald D. Cameron, Ann Arbor, Mich., assignor to Cougar Archery Products, Ann Arbor, Mich.

Filed Feb. 1, 1990, Ser. No. 473,400

Int. Cl.[5] F41B *5/00*; B23D *19/04*

U.S. Cl. 124—89 **14 Claims**



1. An archery bow stabilizer and embedded arrowhead extractor comprising:

an elongated shaft having an enlarged head at one end thereof;

a weight surrounding said shaft and having a bore extending longitudinally therethrough, said bore having a first portion with a diameter larger than said shaft and smaller than said enlarged head and a second portion with a diameter larger than the enlarged head to enable said head to slide through said second portion, a radial shoulder being formed at the merger of said bore portions;

said shaft having a mounting end opposite from said enlarged head, said mounting end including means for mounting said shaft to said archery bow and means for coupling said mounting end to an arrowhead;

said shaft being positioned in said bore in a first direction with the enlarged head engaging one end of said weight and the mounting end of said shaft projecting from the opposite end of said weight a predetermined distance for mounting said shaft to said bow for use as a bow stabilizer; and

said shaft being positioned in said bore in a second direction opposite said first direction with the enlarged head slidable in said bore second portion, said shaft mounting end

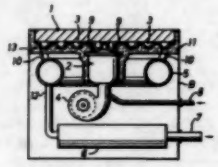
being coupled to an embedded arrowhead whereby reciprocating motion of said weight impacting said shoulder against said enlarged head removes said arrowhead.

4,957,096

GAS COOKING APPLIANCE

Nobuyoshi Yokoyama, c/o Engineering Department of Paloma Kogyo K.K., 6-23, Momozono-cho, Mizuho-ku, Nagoya-shi, Aichi-ken, Japan

Filed Dec. 1, 1989, Ser. No. 444,397
Claims priority, application Japan, Jul. 25, 1987, 62-114402
Int. Cl.[5] F24C *3/00*
U.S. Cl. 126—39 H **4 Claims**



1. A gas cooking appliance for cooking chow mein, pan cakes or the like on a hotplate mounted thereon, comprising:

a pulse combustion burner, installed within an internal compartment of the appliance and having a combustion chamber coupled with a bottom portion of said hotplate, suitable to effect pulse combustion of a mixture of gaseous fuels and air supplied thereinto;

wherein said hotplate is in the form of a thick metallic plate having immediately adjacent only the bottom portion thereof, a tailpipe passage which is connected at one end to an exhaust port of said combustion chamber and extends outwardly along and in direct contact with said metallic plate to permit the flow of combustion products, discharged therethrough, from said combustion chamber; and

wherein the tailpipe passage is formed by pressed sheet metal secured to the bottom portion of said metallic plate.

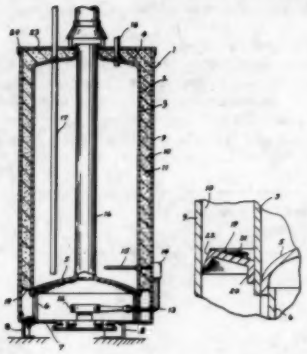
4,957,097

FOAM INSULATED VESSEL AND METHOD OF MAKING THE SAME

James L. Chevalier, Mequon; John D. Pfeffer, Brookfield, and Thomas F. Brownell, Oconomowoc, all of Wis., assignors to AOS Holding Company, Wilmington, Del.

Filed Feb. 18, 1988, Ser. No. 157,320
Int. Cl.[5] F24H *1/00*
U.S. Cl. 126—373 **5 Claims**

1. A foam insulated vessel, comprising a tank member to contain a fluid, a jacket member spaced outwardly of said tank member to provide an annular cavity therebetween, a flexible relatively stiff annular sealing strip disposed within said cavity, and aperture means at one end of said cavity for introducing a liquid foamable resin into said cavity, said strip having one edge secured to a first of said members and having a second distal edge disposed in sliding contact with the second of said members to provide a seal for said cavity, the central portion of said strip between said edges being arched in a direction toward said aperture means, said liquid foamable resin being supported by said strip to enable said liquid resin to expand to substantially fill said cavity and provide an insulating layer between said tank member and said jacket member, said strip being constructed and arranged such that the pressure exerted by said foamable resin against said arched central portion will



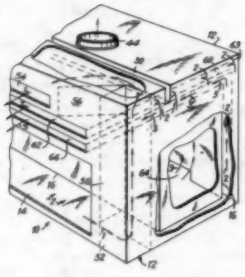
urge said distal edge into tight engagement with said second member.

4,957,098

WALL SHIELD AND CHIMNEY SUPPORT

John G. Meeker, Rte. 6, Jeferson Valley, N.Y. 10535

Continuation of Ser. No. 203,853, Jun. 7, 1988, abandoned. This application Jun. 13, 1989, Ser. No. 366,281
Int. Cl.[5] F24B *7/00*
U.S. Cl. 126—531 **10 Claims**



1. A wall shield and chimney support unit for insertion into a wall comprising flammable materials, comprising:

an outermost metal box comprising a front wall, a rear wall, side walls, and top and bottom walls, an opening being formed in the front wall of said box,

a chimney duct member extending from the top wall of the box and adapted to mate with an associated chimney in an associated dwelling,

support means formed integrally with the top of said box for supporting the weight of the associated chimney, and

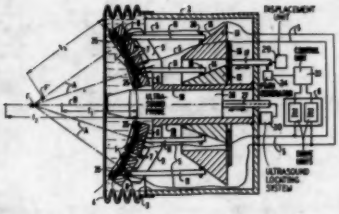
air ducting means for ducting air in plural different air flow paths from inlets near the bottom front of the box up the front lateral corners of the box, thence laterally inwardly and exiting through at least one exit opening generally in the front surface of the box,

whereby flammable building materials may be brought in close juxtaposition to the periphery of the front of said box.

4,957,099
SHOCK WAVE SOURCE FOR EXTRACORPOREAL LITHOTRIPSY

Dietrich Hassler, Uttenreuth, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jan. 12, 1989, Ser. No. 296,077
Claims priority, application Fed. Rep. of Germany, Feb. 10, 1988, 3804096
Int. Cl.[5] A61B *17/22*
U.S. Cl. 128—24 A 20 Claims



1. A shock wave source for non-contacting disintegration of calculi in a patient comprising:

a housing having an emission face;

a transducer arrangement in said housing consisting of a plurality of electro-acoustic transducers arranged on a concave surface, said transducer arrangement having an acoustic axis and each transducer having an acoustic axis in respective planes containing the acoustic axis of the transducer arrangement;

a shock wave-propagating medium disposed in said housing at least between said transducers and said emission face;

means for driving said transducers to generate shock waves in said medium adapted for disintegrating a calculus in a patient;

means for individually pivotally mounting each of said transducers so that the respective acoustic axes of said transducers are pivotable in said respective planes containing the acoustic axis of the transducer arrangement; and

means for adjustably controlling pivoting of said transducers in common so that their acoustic axes intersect at a focus on said acoustic axis of said transducer arrangement and for displacing said focus along said acoustic axis of said transducer arrangement.

4,957,100
ULTRASOUND GENERATOR AND EMITTER

Ludwig Herzog, and Volker Knapp, both of Waldmichelbach, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Mar. 8, 1988, Ser. No. 165,548
Claims priority, application Fed. Rep. of Germany, Mar. 20, 1987, 3709110
Int. Cl.[5] A61B *23/02*
U.S. Cl. 128—24 A 6 Claims

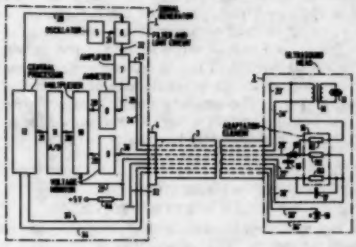
6. A method for substituting components in an ultrasound device having an ultrasound head which includes an ultrasound transducer and having a drive circuit for driving said ultrasound transducer,

wherein said ultrasound transducer is removably mounted in said ultrasound head and an

adaptation element which is electrically connected in a signal path between said ultrasound transducer is removably mounted in said ultrasound head, said method comprising the steps of:

electrically matching said adaptation element to said ultrasound transducer before installation of said adaptation element and said ultrasound transducer in said ultrasound head;

installing the matched ultrasound transducer and adaptation element as a pair in said ultrasound head; and

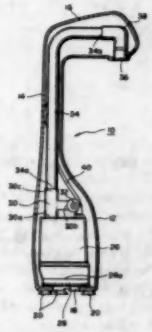


removing the matched ultrasound transducer and adaptation element as a pair from said ultrasound head in the event of a substitution of said ultrasound transducer.

4,957,101
PORTABLE BUBBLE BATH ASSEMBLY

Zenzaburo Hara, Tokyo, Japan, assignor to Hara Health Industrial Co., Ltd., Tokyo, Japan

Filed Aug. 21, 1987, Ser. No. 88,422
Int. Cl.[5] A61H *9/00*
U.S. Cl. 128—66 4 Claims



1. In a bubble bath assembly for use on the bottom wall of a bathtub and for creating a bubbling effect in the water in the bathtub, the bubble bath assembly including: pump means for drawing water thereinto from the bathtub and for discharging water under pressure into the bathtub, the pump means having an inlet and an outlet; a nozzle member connected to the outlet of the pump means for discharging water in a jet therefrom; and means for retaining the nozzle member over the water in the bathtub upon the installment of the assembly in the bathtub so that the jet of water is directed against the surface of the bath water when the pump means is operated, the improvement wherein the pump means comprises an underwater electric pump, and wherein the retaining means comprises: means for stably setting the underwater electric pump on the bottom wall of the bathtub; and support means, interposed between the pump and the nozzle member, for supporting the nozzle member over the pump, said setting means comprising a bottom housing in which said electric pump is enclosed and rigidly mounted, the bottom housing having a lower end surface and being adapted to be disposed within the bathtub, said setting means further comprising one or more suction cup members, attached to and projecting from the lower end surface of the

bottom housing, for releasably securing the bottom housing to the bottom wall of the bathtub, said bottom housing including means for urging the bottom housing toward the bottom wall of the bathtub, the urging means comprising a suction opening formed in the lower end surface of the bottom housing, the suction opening in fluid communication with the inlet of the electric pump, said one or more suction cup members being arranged at that portion of the lower end surface around said suction opening, an auxiliary nozzle member connected to the outlet of the pump, the auxiliary nozzle member attached to the bottom housing so that water is jetted out of the auxiliary nozzle member in a generally horizontal direction.

4,957,102

LUMBAR SUPPORT DEVICE

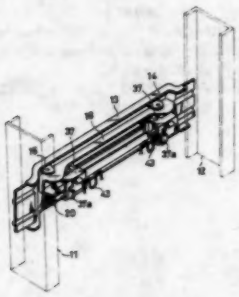
Kenichi Tan, and Shoji Mizuno, both of Ayase, Japan, assignors to Ikeda Bussan Co., Ltd., Ayase, Japan

Filed Sep. 27, 1988, Ser. No. 249,667

Claims priority, application Japan, Sep. 30, 1987, 62-148163[U]

Int. Cl.[5] A61F *5/00*

U.S. Cl. 128—68 **5 Claims**



1. A lumbar support device within a seat back comprising:
a pair of vertical side frames;
a horizontal lower frame fixed at said side frames at the position of the lumbars of an occupant;
a horizontal lumbar frame including two ends vertically movably supported by the horizontal lower frame;
a pair of support brackets each one forwardly and rearwardly movably supported by one of said ends of said horizontal lumbar frame via a pair of link mechanisms;
a support member fixed to said brackets to support the lumbars of the occupant;
a first pair of air mats each one interposed between the lumbar frame and one of the support brackets;
a second pair of air mats each one interposed between the lower frame and one of the ends of said lumbar frame; and
an air supply and discharge means connected to the first air mats to forwardly and rearwardly move the bracket, and connected to the second air mats to vertically move the horizontal lumbar frame.

4,957,103

ORTHOPAEDIC BODY JACKETS

David E. Young, Watlington, and Kenneth P. Davis, Hillington, both of England, assignors to Protectair Limited, Abingdon, England

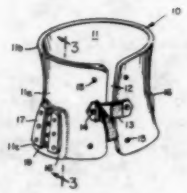
Continuation-in-part of Ser. No. 882,597, Jul. 7, 1986, Pat. No. 4,776,326. This application Sep. 27, 1988, Ser. No. 249,729

Claims priority, application United Kingdom, Oct. 14, 1987, 8710080; Jun. 27, 1988, 8815259

Int. Cl.[5] A61F *5/02*

U.S. Cl. 128—78 **8 Claims**

1. An orthopaedic body jacket comprising a semi-rigid thermoplastic shell adapted to be fitted and fastened around the abdomen of a patient; said shell having a constricted waist portion and outwardly flared upper and lower portions; said shell having a pair of front portions defining a ventral opening therebetween and being sufficiently flexible to permit said front portions to be flexed apart when fitting said shell about the waist of a wearer; said shell also having an integrally mounded upstanding lateral portion; said lateral portion extending upwardly from said flared lower portion and having an upper end protruding outwardly a substantial distance from



said constricted waist portion; means along said upstanding lateral portion defining a generally verticallyextending externally-facing channel that opens laterally outwardly away from said shell and having a straight, outwardly-facing, planar surface for mounting an orthotic component in any of a plurality of positions of vertical adjustment; sand externally-facing channel being of substantially uniform width throughout its length.

4,957,104

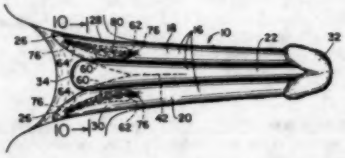
IMPROVEMENTS TO OBVIATE PURE VENOUS IMPOTENCE

Adrian W. Zorgniotti, 33 E. 74th St., New York, N.Y. 10021

Filed Apr. 27, 1989, Ser. No. 343,628

Int. Cl.[5] A61F *2/26*

U.S. Cl. 128—79 **4 Claims**



1. A method of obviating male impotence due to venous leakage preventing erection of the penis by using hollow plastic implants, said method comprising the steps of selecting two implant sites in which each site is a location in each posterior end of the penis corpora cavernosa adjacent to the penis outflowing venous system and is oriented lengthwise of the penis on opposite sides of the penis centrally located corpus spongiosum, suturing in place each said ;hollow plastic implant at each said selected site in a clearance position from said corpus spongiosum with said outflowing venous system contributing to said venous leakage in said clearance therebetween, and increasing and decreasing the size of each said plastic implant by injecting thereinto and removing therefrom fluid to obtain a fluid volume effective to correspondingly adjust the size of said clearance, whereby said venous system is squeezed closed during erection by said implants creating a reduced clearance therebetween to the extent effective to counteract said venous leakage.

4,957,105

FEMORAL COMPRESSION DEVICE FOR POST-CATHETERIZATION HEMOSTASIS

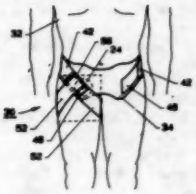
Paul A. Kurth, 1423 Brett Pl., Apt. 201, San Pedro, Calif. 90732

Filed Oct. 4, 1988, Ser. No. 253,188

The portion of the term of this patent subsequent to May 16, 2006, has been disclaimed.

Int. Cl.[5] A61F *5/24*

U.S. Cl. 128—96.1 21 Claims



1. An apparatus for applying pressure to a femoral vessel within the groin in the abdomen of a human body comprising:

a pellet means for applying a directed force to said femoral vessel of said human body;

a pelvic apron means for positioning said pellet means over said femoral vessel in one leg, said pellet means attached to said pelvic apron means, said pelvic apron means encircling said abdomen, extending downwardly toward said groin and completing encirclement of said abdomen at said groin; and

groin strap means for applying a compressive force to said pellet means tending to compress said femoral vessel, so that a substantial inward force is adjustably applied to said femoral vessel and blood flow therefrom is stanched, said groin strap means having a first and second end, said first end attached to said pelvic apron means, said groin strap means extending over said point of attachment of said pellet means to said pelvic apron means toward said g roin, around and behind said one leg, said second end of said groin strap means attaching to said pelvic apron means in the overlapping proximity of said point of attachment thereto of said pellet means to include said pellet means within the encirclement of said groin strap means, said groin strap means encircling the upper portion of said one leg and completing said encirclement at said groin where said apron means completes enciclement of said abdomen, said groin strap means and pelvic apron means forming in combination a figure of eight with the intersection of said figure of eight at said point of attachment of said pellet means at said groin.

4,957,106

GAS MASK COUPLED TO MONOLITHIC MEMBER WITH SPEECH MEMBRANE

Gilbert Vandeputte, Berchem, Belgium, assignor to Engicom, Naamloze Vennootschap, Brussels, Belgium

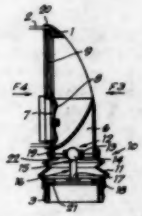
Continuation of Ser. No. 24,999, Mar. 12, 1987, abandoned. This application Nov. 17, 1988, Ser. No. 273,127

Claims priority, application Belgium, Mar. 12, 1986, PV2/60937

Int. Cl.[5] A62B *18/08*

U.S. Cl. 128—201.19 7 Claims

1. A gas mask comprising a facepiece with a seat, a monolithic member having wall means made of rigid material and a plurality of seats formed therein, means for mounting said monolithic member in said seat of said facepiece, inlet opening means, outlet valve means, and speech membrane means each mounted in respective seats of said monolithic member, and an axis defined as being normal to the surface of and extending through the center of said inlet opening means and a coupling member pivotably mounted on said monolithic member for pivoting about said axis, said coupling member having an inlet opening and an outlet opening, said outlet opening connected



with said inlet opening means and said inlet opening of said coupling member traveling along an arc during pivoting of said coupling member about said axis.

4,957,107

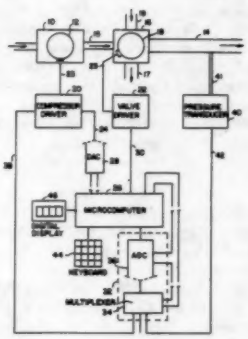
GAS DELIVERY MEANS

Anatole J. Sipin, 221 E. 78th St., New York, N.Y. 10021

Filed May 10, 1988, Ser. No. 192,177

Int. Cl.[5] A61M *16/00*

U.S. Cl. 128—204.21 17 Claims



1. A system to cyclically deliver a controlled volume of gas through a line including:

(a) A variable speed rotary compressor driven by a rotary electric motor to supply pressurized gas;

(b) valve means to direct gas from the compressor to the line during the delivery interval of the cycle, and to divert the gas between such intervals;

(c) control means to drive the compressor motor and to actuate the valve means said control means including;

Means to select and maintain the cycle frequency;

Means to select and control the time of the delivery interval;

Means to select a reference value of the delivered gas volume;

Means to measure the instantaneous flow rate of the gas supplied by the compressor during a delivery interval of the cycle;

Means to compute the average flow rate measurement during the delivery interval to provide a computed value of the delivered gas volume; and

Means to adjust the compressor speed in the next succeeding delivery interval by an increment related to the difference between the computed value of the delivered gas volume and the reference value of delivered gas

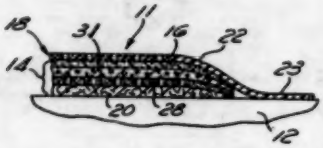
volume in a direction to reduce the difference between said delivered gas volume and said reference gas volume.

4,957,108

METHOD AND APPARATUS FOR DETERMINATION OF CHEMICAL SPECIES IN BODY FLUID

Donald W. Schoendorfer, and William R. Miller, both of Santa Ana, Calif., assignors to Sudor Partners, Santa Ana, Calif.

Filed Sep. 8, 1988, Ser. No. 241,707
Int. Cl.[5] A61B *5/00*
U.S. Cl. 128—632 **8 Claims**



1. A dermal concentration patch for determining the presence of an analyte in a subject mammal's perspiration, comprising:

a water permeable support layer having a first and a second side;

at least one reagent immobilized to the support layer;

means for removably securing the first side of the support layer in fluid communication with the subject's skin,

wherein water is permitted to escape through the support layer and outside of the concentration patch, and the reagent comprises a specific binding partner for the analyte to be determined; and

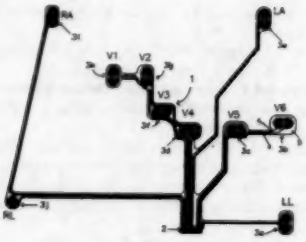
a permeable outer protective layer disposed adjacent the second side of the support layer.

4,957,109

ELECTROCARDIOGRAPH SYSTEM

Jeffrey Groeger, Bardonia, and Saul Miodownik, W. Hempstead, both of N.Y., assignors to Cardiac Spectrum Technologies, Inc., Bardonia, N.Y.

Filed Aug. 22, 1988, Ser. No. 234,982
Int. Cl.[5] A61B *5/04*
U.S. Cl. 128—640 **7 Claims**



1. An electrode assembly for receiving physiological signals, comprising:

a flexible substrate comprising a first section disposable over the heart and at least three elongated sections extending from the first section having a bottom surface and a top surface;

means forming a plurality of electrodes at the bottom surface of the substrate at the first section and the elongated sections and each electrode having a bottom surface facing away from the substrate;

an electrode connector fixed to the substrate and having a plurality of connector elements;

a plurality of flexible conductors fixed on the substrate and connecting the plurality of electrodes to the connector elements;

means for adjusting the length of at least one of the three elongated sections of the substrate and the conductors fixed thereto comprising means for releasably retaining the at least one elongated section folded on itself;

a layer of conductive adhesive on the bottom surface of each electrode; and

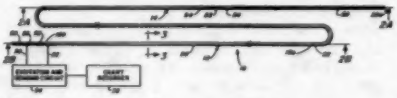
an adhesive layer on at least a portion of the bottom surface of the substrate.

4,957,110

STEERABLE GUIDEWIRE HAVING ELECTRODES FOR MEASURING VESSEL CROSS-SECTION AND BLOOD FLOW

Robert A. Vogel, Lutherville, Md.; William A. Berthiaume, Hudson, and Thomas J. Palermo, Methuen, both of Mass., assignors to C. R. Bard, Inc., Murray Hill, N.J.

Filed Mar. 17, 1989, Ser. No. 325,223
Int. Cl.[5] A61B *5/04, 5/026*
U.S. Cl. 128—642 **40 Claims**



1. A steerable guidewire comprising:

an elongated shaft having a distal end and a proximal end, said shaft being sufficiently torsionally rigid along its length for controllably transmitting to the distal end substantially all of the rotation applied to the proximal end, said shaft including a first electrical conductor and a second electrical conductor insulated from said first electrical conductor, said electrical conductors extending from the distal end to the proximal end of said shaft; and

a tip attached to the distal end of said shaft, said tip adapted to be bent to a desired curve, said tip being sufficiently flexible so as to adapt to and follow the contours of a blood vessel, said tip including a distal electrode electrically connected to one of said conductors and a proximal electrode electrically connected to the other of said conductors, said electrodes being axially spaced apart on said tip by a predetermined distance, said distal electrode comprising a distal, conductive, helically-wound spring and said proximal electrode comprising a proximal, conductive helically-wound spring, said tip including a tapered distal region of said second conductor passing through said proximal spring at and least a portion of said distal spring and electrically connected to said distal spring.

4,957,111

METHOD OF USING A DOPPLER CATHETER

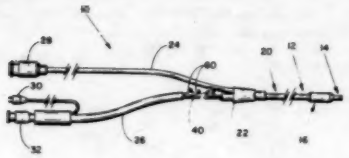
Huntly D. Millar, Houston, Tex., assignor to Pfizer Hospital Products Group, Inc., New York, N.Y.

Continuation of Ser. No. 943,446, Dec. 16, 1986, Pat. No. 4,889,128, and a continuation of Ser. No. 775,857, May 19, 1987, Pat. No. 4,665,925. This application Sep. 23, 1988, Ser. No. 248,777
Int. Cl.[5] A61B *8/12*
U.S. Cl. 128—662.06 **5 Claims**

1. A method of treating stenosis in the arterial tree comprising the steps of:

providing a catheter having a Doppler crystal attached at the distal tip thereof and axially oriented therewith, an angio-balloon proximate to the distal end, and a passageway disposed for operable contact with the blood stream;

placing a wire guide in the passageway;
inserting the catheter into the arterial tree;
manipulating the wire guide to position the catheter in the region of the stenosis;



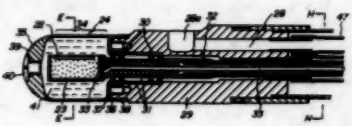
expanding the angio-balloon in the region of the stenosis; and
operating the Doppler crystal to measure the velocity of the blood in the region of the stenosis.

4,957,112

ULTRASONIC DIAGNOSTIC APPARATUS

Takeshi Yokoi, Hachioji; Tsuguhisa Sasai; Kenji Hirooka, both of Tokyo, all of Japan, assignor to Olympus Optical Co., Ltd, Tokyo, Japan

Filed Nov. 17, 1988, Ser. No. 272,464
Claims priority, application Japan, Nov. 20, 1987, 62-176500; Dec. 26, 1987, 62-331519; Dec. 28, 1987, 62-330292
Int. Cl.[5] A61B *8/12*
U.S. Cl. 128—662.06 **12 Claims**



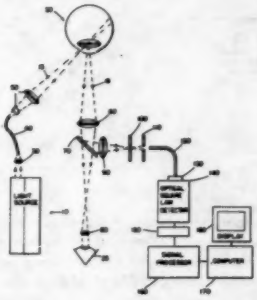
1. An ultrasonic diagnostic apparatus comprising:
an inserting portion having distal and proximal ends and a center axis at said distal end;
an ultrasonic wave transmitting and receiving means having an ultrasonic vibrating element arranged at the distal end of the inserting portion for transmitting and receiving an ultrasonic wave for scanning an object to be inspected along a plane that crosses at substantially right angles with respect to an axis of the inserting portion;
a cover arranged at the distal end of said inserting portion and having a window, said window having a preformed curvature through which the ultrasonic wave transmitted by said ultrasonic vibrating element exits toward the object and the ultrasonic wave reflected by the object is made incident upon said ultrasonic vibrating element;
a rotating means connected to said ultrasonic wave transmitting and receiving means for rotating at least a part of said ultrasonic wave transmitting and receiving means about an axis of rotation to scan the object along said plane;
an illuminating system for illuminating the object; and
an observing system for forming an optical image of said object;
whereby the axis of said inserting portion at said distal end is arranged to be deviated from said rotating axis of said ultrasonic wave transmitting and receiving means in a radial direction with respect to said rotating axis; and said center of curvature of said window is arranged to be coincident with the rotating axis of said ultrasonic wave transmitting and receiving means.

4,957,113

METHOD FOR DETECTING CATARACTOGENESIS USING QUASI-ELASTIC LIGHT SCATTERING

George B. Benedek, Belmont, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation of Ser. No. 91,658, Sep. 1, 1987, abandoned. This application Jan. 8, 1990, Ser. No. 463,883
Int. Cl.[5] A61B *3/10*
U.S. Cl. 128—665 **16 Claims**



1. A method for in-vivo inspection of ocular tissue comprising:
(a) providing a source of substantially monochromatic, coherent, collimated light;
(b) focusing light from the source on a specific measurement location of a subject'ocular tissue;
(c) collecting the light scattered by the ocular tissue;
(d) converting the scattered light into an electrical signal representative of temporal fluctuations in the intensity of the scattered light;
(e) analyzing the electrical signal produced by the scattered light to determine the relative average intensity of the light scattered by slow moving protein aggregates in the ocular tissue (I_s) and the relative average intensity of the light scattered by fast moving protein species in the ocular tissue (I_f); and
(f) locating the position of a first member of the group of variables consisting of I_s, I_f, and their sum I_{tot} on a universal curve produced by plotting the first member of the group as a function of a second member of the group, the position on the curve corresponding to the degree of cataractogenesis at the specific measurement location in the ocular tissue of the subject.

4,957,114

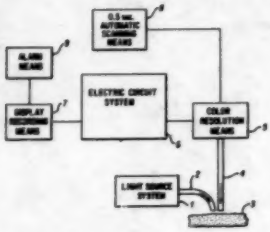
DIAGNOSTIC APPARATUS FOR INTRINSIC FLUORESCENCE OF MALIGNANT TUMOR

Kun Zeng; Jinrong Wu; Sen Yang; Zhenfen Yu, all, of No. 77 Jiangning Lu, and Jiude Zhu, No. 111 Zun Yi Lu, all of Shanghai, China

Continuation of Ser. No. 843,950, Mar. 25, 1986, abandoned. This application Jun. 28, 1988, Ser. No. 212,630
Claims priority, application China, Apr. 1, 1985, 85100424
Int. Cl.[5] A61B *6/00*
U.S. Cl. 128—665 **7 Claims**

1. An apparatus for the diagnosis of malignant tumors comprising:
(a) means for generating near ultraviolet light having a frequency range of 3000° A to 4000° A;
(b) light transmission means composed of a bundle of optical fibers for transmitting the light to the surface of a tumor in order to stimulated intrinsic fluorescent light emission from said tumor;
(c) further light transmission means composed of a second bundle of optical fibers having an incident end and an

efferent end for transmitting the stimulated intrinsic fluorescence light emitted by the tumor wherein the incident end of said second bundle of optical fibers has means to maintain the incident end of the fibers in a position perpendicular to the surface of the tumor;



(d) color resolution means connected to the efferent end of said second bundle of optical fibers for processing the intrinsic fluorescent light output therefrom in order to determine the presence of light of a frequency of 6000° A to 6900° A, characterizing the presence of a malignant tumor.

4,957,115

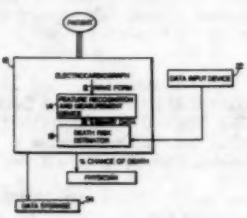
DEVICE POR DETERMINING THE PROBABILITY OF DEATH OF CARDIAC PATIENTS

Harry P. Selker, Wellesley, Mass., assignor to New England Medical Center Hosp., Boston, Mass.

Filed Mar. 25, 1988, Ser. No. 173,220

Int. Cl.[5] A61B 5/04

U.S. Cl. 128—696 **22 Claims**



1. A device for determining the probability of imminent death of a patient from cardiovascular disease comprising:

a. an electrocardiograph adapted to deliver a signal in the form of an electrical waveform containing information about the condition of said patient's heart;

b. a waveform recognition and measurement device adapted to analyze said waveform and generate output based on said analysis; and

c. a computer adapted to receive said output and calculate a numerical value representing said probability based on said output.

4,957,116

METHOD AND DEVICE OF BRAIN'S CARTOGRAPHY IMPLEMENTED BY INTERPOLATION

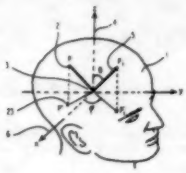
Jacques Pernier, Saint Priest, and Francois Perrin, Sainte Foy, both of France, assignors to Institut National de la Sante et de la Recherche Medicale, I.N.S.E.R.M., Paris, France

Filed Jan. 19, 1989, Ser. No. 299,153

Claims priority, application France, Jan. 19, 1988, 88 00545

Int. Cl.[5] A61B 5/04

U.S. Cl. 128—731 **7 Claims**



1. A device for the determination of the value of an electrical quantity $U_m(P)$ at any particular site P of a sphere, based on measurements Z_i of said electrical quantity made at known sites P_i on said sphere, said device comprising:

measuring means for measuring the values Z_i of said electrical quantity at n said sites P_i having polar coordinates (θ_i, ϕ_i) *and cartesian coordinates* (x_i, y_i, z_i) with respect to X, Y and Z axes, respectively, where n is an integer, i is an integer between 1 and n, θ_i is an angle formed with respect to said Z axis by a vector joining a center of said sphere with a site P_i, and ϕ_i is an angle formed with respect to said X axis by a projection, into a projection plane containing said X and Y axes, of a vector joining said center of said sphere with said particular site P;

a storage memory for storing coordinates (θ_i, ϕ_i) and associated measured values Z_i of said electrical quantity;

a computer for

(1) calculating for the n sites P_i the values:

$x_i = \cos \phi_i$

$y_i = \sin \theta_i$

$$z_i = \sqrt{1 - x_i^2 - y_i^2} \quad \text{if } \theta_i \leq \frac{\pi}{2}$$

$$- \sqrt{1 - x_i^2 - y_i^2} \quad \text{if } \theta_i > \frac{\pi}{2}$$

(2) calculating for all pairs of said n sites (P_i, P_j), where i and j are integers between 1 and n:

$$d_{ij} = \sqrt{(x - x_i)^2 + (y - y_i)^2 + (z - z_i)^2}$$

$$\text{and } \cos \phi_{ij} = 1 - \frac{d_{ij}^2}{2}$$

(3) generating a vector K of values k_{ij} of a function k_m ($\cos\phi_{ij}$) for each of said pairs of sites (P_i, P_j) by reading out the value of the funtion k_m from a pre-computed table,

(4) constructing the matrix:

$$\begin{bmatrix} K & E \\ E^t & O \end{bmatrix}$$

where E is a table $(1,1, \ldots . 1)^t$,

(5) determining the value of coefficients $P = (p_i \ldots p_n)^t$ and the value of a variable q by resolution of the matrix:

$$\begin{bmatrix} K & E \\ E' & O \end{bmatrix} \times \begin{bmatrix} P \\ q \end{bmatrix} = \begin{bmatrix} Z \\ O \end{bmatrix}$$

where Z is a table $(Z_1, \ldots Z_n)^t$ of measured values Z_i.

(6) computing, for all points P' of coordinate (X,Y) of said projection plane, the values, in the case of a radial type projection mode:

$$\theta = \sqrt{X^2 + Y^2}$$

$$x = X \frac{\sin \theta}{\theta}$$

$$y = Y \frac{\sin \theta}{\theta}$$

$$z = \sqrt{1 - x^2 - y^2} \quad \text{if } \theta \leq \frac{\pi}{2} -$$

$$\sqrt{1 - x^2 - y^2} \quad \text{if } \theta > \frac{\pi}{2}$$

(7) determining the coefficient:
$\cos \phi\,(P,P_i) = 1 - d^2/2$

$$\cos \phi(P, P_i) = \frac{1 - d^2}{2}$$

(8) determining the variable k_m (cos ϕ) by reading out the value of the function k_m from a pre-computed table, and

(9) calculating the value:

$$U_m(P) = \sum_{i=1}^{n} p_i \cdot k_m + q$$

corresponding to the value of the electric signal at said particular point P; and

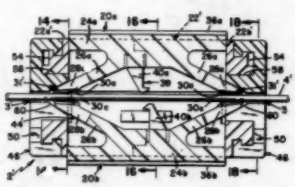
display means for displaying said calculated value of $U_m(P)$.

4,957,117

ONE-HANDED PERCUTANEOUS TRANSLUMINAL ANGIOPLASTY STEERING DEVICE AND METHOD

Douglas G. Wysham, Shoreview, Minn., assignor to Ramsey Foundation, St. Paul, Minn.

Filed Nov. 3, 1988, Ser. No. 266,584
Int. Cl.[5] A61B 5/00
U.S. Cl. 604—95 **22 Claims**



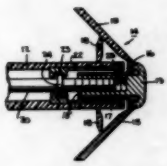
1. A steering device for directing passage of a remote portion of a length of wire, said steering device comprising releasable gripping means for releasably gripping a proximate portion of the length of wire when said gripping means is manipulated by the exertion of a force upon a gripping member of said gripping means so that the gripping member is moved into a gripping position, said steering device including releasable locking means for locking said gripping member in a gripping position in opposition to an opposing gripping face of said gripping means, said locking means including first and second engaging portions interconnected with said gripping member and said opposing gripping face, respectively, such that when said respective engaging portions are engaged with one another, and the gripping member is in the gripping position, the gripping member is retained in the gripping position by said engaged engaging portions.

4,957,118

ELECTRODE LEAD

Jay Erlebacher, 55 Woodland Park Dr., Tenafly, N.J. 07670

Filed Jan. 15, 1988, Ser. No. 144,487
Int. Cl.[5] A61N 1/00
U.S. Cl. 128—785 **27 Claims**



1. An electrode lead comprising

an elongated tubular body;

an electrically conductive tip mounted in a distal end of said body;

a plurality of tines disposed about said tip, each said tine being fixedly secured at one end relative to said tip;

a plurality of struts connected to and between said tines and said body to permit movement of said tines between a retracted position towards said body and an extended position away from said body; and

means extending within said body and connected to said tip for moving said tip relative to said body to cause said tines to move between said positions.

4,957,119

CONTRACEPTIVE IMPLANT

Hendrik de Nijs, Oss, Netherlands, assignor to Akzo N.V., Arnhem, Netherlands

Filed Aug. 5, 1988, Ser. No. 229,066
Claims priority, application Netherlands, Aug. 8, 1987, 8701868
Int. Cl.[5] A61K 9/22
U.S. Cl. 128—832 **15 Claims**

1. An implant intended for subcutaneous or local administration, comprising:

core material of ethylene/vinyl acetate copolymer having such a molecular weight that the melt index is greater than 10 grams/10 minutes, and a vinyl acetate content of at least 20% by weight, which core material functions as a matrix for at least one contraceptive substance selected from the group consisting of 3-keto-desogestrel, levonorgestrel and gestodene in a quantity which is sufficient for a constant release of at least 15–30 μg contraceptive substance per day over a predetermined term, and

a membrane having a layer thickness of 50–250 μm which encases the core material and also consists of ethylene/vinyl acetate copolymer, but with such a molecular weight that the melt index is less than 10 grams/10 minutes and a vinyl acetate content of less than 20% by weight, which membrane, with the core material, forms a contact layer at the interface of the core material and membrane, said contact layer preventing the core material and membrane from separating from one another.

4,957,120

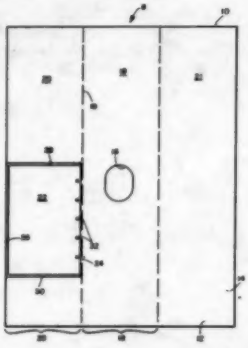
SURGICAL DRAPE WITH EXTREMITY POUCH

Carletta Grier-Idris, Acworth, Ga., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Continuation of Ser. No. 246,041, Sep. 16, 1988, abandoned. This application Feb. 6, 1990, Ser. No. 474,694

Int. Cl.[5] A61F 13/00

U.S. Cl. 128—849 4 Claims



1. A surgical drape for use in limb surgery on an operating table having atop comprising a main sheet having an external surface and a bottom surface and a fenestration to permit a limb to be extended therethrough from said bottom surface to said external surface, said main sheet having a first section which is adapted to be positioned on said operating table top and includes said fenestration, and a second section which is adapted to hang below said operating table, and

a pouch for receiving said limb when positioned below said operating table top, said pouch being secured to said external surface of said main sheet on said second portion, said pouch having a top edge and a bottom edge jointed by opposed first and second side edges, said first and second side edges and said bottom edge being secured to said main sheet and said top edge being detachably secured to said main sheet to allow said pouch to be opened to receive said limb and then closed after insertion of said limb.

4,957,121

MOBILE INTENSIVE CARE PATIENT HANDLING SYSTEM APPARATUS AND METHOD OF USING

Timothy Icenogle; William F. Machamer; Robert J. Nelson; Stephen Mikitish, Jr., and Robert R. Davis, all of Tucson, Ariz., assignors to Arizona Technology Development Corporation, Tucson, Ariz.

Filed Jul. 5, 1988, Ser. No. 217,365

Int. Cl.[5] B64D 9/00

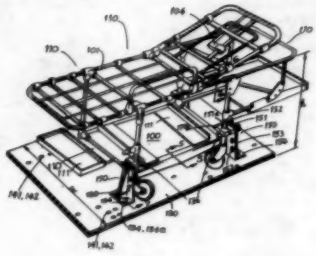
U.S. Cl. 128—897 10 Claims

1. A mobile intensive care patient handling transport apparatus, said apparatus comprising:

(a) framework means for supporting a critically ill patient in a cot portion and associated life sustaining medical equipment secured in an undercarriage portion of said framework means, said undercarriage portion having restraint bracket attachment members for attaching to a conventional ambulance restraint bracket means provided on conventional ground ambulance vehicles; and

(b) detachable pallet means for supporting said framework means, said detachable pallet means having first restraint bracket means for detachably securing said framework means to said pallet means utilizing said restraint bracket attachment members, said first restraint bracket means comprising a pallet mounting plate member and a framework undercarriage mounting member, said framework undercarriage mounting member being mechanically coupled to said pallet mounting plate member,

said detachably secured framework means and said pallet means forming a transportable unit for being transported in an aircraft,



said detachable pallet means having second restraint bracket means attached to an underside of said pallet means for securing said pallet means to seat rails of said aircraft.

4,957,122

DEVICE FOR THE ELECTROSTATIC PERFORATION OF WEBS OF PAPER

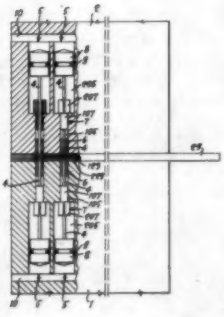
Paolo Maldina, Bologna; Maurizio Piana, Casalecchio di Reno, and Antonio V. Suzzi, Bologna, all of Italy, assignors to Sasib, S.p.A., Bologna, Italy

Filed Sep. 6, 1983, Ser. No. 529,851

Claims priority, application Italy, Sep. 15, 1982, 12621 A/82

Int. Cl.[5] A24C 5/00, 5/60

U.S. Cl. 131—281 24 Claims



1. A device for electrostatic perforation of a web, comprising:

a first electrode-carrying head; and

a second electrode-carrying head spaced apart from said first head to permit said web to pass between said heads along a path having a portion thereof lying in a plane, said second electrode-carrying head including

an electrode support,

a plurality of needle-shaped electrodes having axes and discharge ends, said electrodes being slidably mounted to said electrode support with their discharge ends extending toward said first electrode-carrying head and with their axes substantially perpendicular to said plane,

said electrodes being slidable in the direction of their axes, and

adjustment means for exerting a pushing force on said electrodes to force the discharge ends thereof toward said first head so that a predetermined electrode spacing can be achieved when said web is replaced by a gauged shim and said discharge ends are pushed against said shim, said adjustment means additionally including restraining means for exposing said electrodes to an opposing force as they are being pushed,

wherein said electrode support has a plurality of bores, each electrode being disposed in a respective bore, wherein said electrodes have rear ends, and wherein said adjustment means includes, for each electrode, an electrode-carrying clamp disposed in the respective bore and frictionally engaging the electrode, and a piston slidably disposed in the respective bore, the piston having a first side disposed adjacent the rear end of the electrode and a second side for exposure to pressurized fluid.

4,957,123

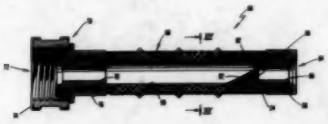
DEVICE FOR CLEANING A DRAIN

George J. McHugh, Broomall, Pa., assignor to AGF Manufacturing, Inc., West Chester, Pa.

Division of Ser. No. 205,214, Jun. 10, 1988, Pat. No. 4,895,178. This application Oct. 6, 1989, Ser. No. 417,897

Int. Cl.[5] **B08B** *9/02*

U.S. Cl. 134—167 C **8 Claims**



1. An apparatus for use in delivering fluid under pressure to a drain of a given diameter, comprising:

a bladder having an inlet end, an outlet end and an expandable wall having an outer diameter which is smaller than the given diameter of the drain when the bladder is unexpanded, the inlet end including an inlet;

supply connection means for connecting the apparatus to a fluid supply source which supplies fluid under pressure to the inlet; and

an orifice member including an end wall located at the outlet end of the bladder, the orifice member extending generally axially at said outlet end of the bladder and having an orifice in the end wall, the expandable wall of the bladder including valve means for closing the orifice when the bladder is unexpanded and for opening the orifice as the bladder is expanded, said valve means including the expandable wall of the bladder which is formed with an inner wall surface having a lip extending radially inwardly of the expandable wall, the lop covering the orifice when the bladder is unexpanded and being pulled away from the orifice by the expandable wall when the bladder is expanded, the outlet end of said bladder being closed except when said orifice is opened by said valve means, whereby when fluid under pressure is supplied to the bladder, the valve means prevents fluid from flowing through the orifice until after the pressure in the bladder initiates expansion in the bladder.

4,957,124

TEMPLATE

Lillian A. Mooney, 7520 E. 550 South, Zionsville, Ind. 46077

Continuation-in-part of Ser. No. 154,232, Feb. 10, 1988, Pat. No. 4,886,079. This application Mar. 14, 1988, Ser. No. 167,772

The portion of the term of this patent subsequent to Dec. 12, 2006, has been disclaimed.

Int. Cl.[5] **A45D** *40/30*

U.S. Cl. 132—200 **7 Claims**

1. A method comprising the steps of:

heating a thin flexible sheet of plastic to a heated condition;

placing said sheet in said heated condition against a person's face;

forcing said sheet while on the person's face and in said heated condition to assume a shape corresponding to various contours of the person's face creating areas to be marked;

marking said areas on said sheet; and,

removing various portions from said sheet according to said marking creating a plurality of openings in said sheet.

4,957,125

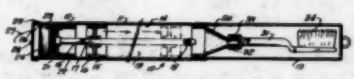
TOOTHBRUSHING ASSEMBLY

Merle L. Yaneza, 11708 S. Valley View, Whittier, Calif. 90604

Filed Jul. 26, 1989, Ser. No. 385,439

Int. Cl.[5] **G01F** *11/00*; **A46B** *11/00*

U.S. Cl. 132—309 **1 Claim**



1. A tooth brushing assembly for dispensing both toothpaste and for dispensing dental floss, said assembly comprising:

a cylindrical toothpaste reservoir having a cap end and an external end and an inner reservoir wall, said cap end including a conical cover to which a toothbrush is removably affixed and wherein said toothbrush includes a cover which is impervious to toothpaste;

a cylindrical knob affixed to said reservoir at the external end thereof, said cylindrical knob having an outwardly facing cylindrical chamber and having an inwardly facing cylindrical chamber and having an inwardly facing cylindrical chamber which surrounds the external end of said reservoir to support the cylindrical knob;

a threaded shaft affixed to said cylindrical knob and extending axially within said cylindrical toothpaste reservoir to about the cap end thereof;

a piston having an outer contact wall and having internal threads which mate with the threads of said threaded shaft, said piston being positioned within said cylindrical reservoir, and the outer contact wall touching the inner reservoir wall;

a spool of dental floss held within said outwardly facing cylindrical chamber; and

cap and cutoff means affixed to said outwardly facing cylindrical chamber.

4,957,126

BRUSH-LESS WASHING INSTALLATION

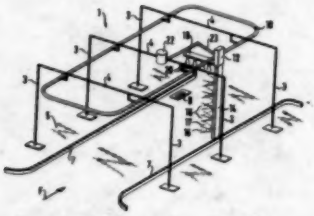
Pierre Allaeys, Poperinge, Belgium, assignor to Cleaning Systems International, Poperinge, Belgium

Filed Jun. 24, 1988, Ser. No. 210,951

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1987, 3723978

Int. Cl.[5] B08I *3/02*

U.S. Cl. 134—57 R **12 Claims**



2. A brush-less washing installation for vehicles comprising: a nozzle assembly for spraying washing fluid on to a vehicle to be cleaned, and including at least one substantially vertically arranged row of nozzles; means for moving said at least one row of nozzles about the vehicle; and means for rotating said row of nozzles at the same time about a vertical axis, in such a way that said nozzles are operable to spray against at least one side surface and at least one of the front and rear surfaces of said vehicle to be cleaned; wherein the row of nozzles includes at least first and second groups of nozzles of which one is designed to provide for a smaller cleaning width and the other for a larger cleaning width; and further comprising sensing means for detecting the length of a vehicle to be washed, for vehicles of different lengths which are always arranged for the washing operation in such a way that their front surface occupies substantially the same position in the washing installation, and means operable with reference to the detected vehicle length to switch the supply of washing fluid between a said group of nozzles with a first said cleaning width to a said group of nozzles with a second said cleaning width when, in the circulatory movement of the row of nozzles around the vehicle, the spacing of the row of nozzles from the respective surface of the vehicle which is just to be cleaned threatens to deviate from a predetermined value.

4,957,127

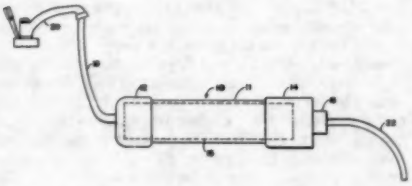
PAINT ROLLER COVER APPLICATOR CLEANING APPARATUS

George P. Kostopoulos, 26 Ruth St., Trumbull, Conn. 06611

Filed Nov. 17, 1989, Ser. No. 438,716

Int. Cl.[5] B08B *3/04*

U.S. Cl. 134—117 **3 Claims**



1. A paint roller cover applicator cleaning apparatus for cleaning a hollow, cylindrical paint roller cover applicator of the type having a hollow body member supporting a paint absorbing layer with the hollow body member being plugged prior to insertion in the apparatus for cleaning comprising:

a cylindrical sleeve housing having an inside diameter slightly smaller than the outside diameter of a paint roller cover applicator to be cleaned by the apparatus;

a first end cap having a central opening therein adapted to couple a water supply to said apparatus mounted on one end of said sleeve;

a coupling means having a first end frictionally mounted on the other end of said cylindrical sleeve housing and a second end having a bayonet socket positioned therein adapted to removably house a second end cap therein;

a second end cap having a plurality of bayonet studs equally spaced around the periphery adapted to be removably inserted and locked in said bayonet socket of said coupling means;

said second end cap having a central opening therein coupled to a discharge hose whereby water is forced through the paint absorbing layer of an applicator placed in said apparatus and the water is discharged from the central opening of said second end cap by said discharge hose for the orderly disposal of the guided paint polluted water from the apparatus.

4,957,128

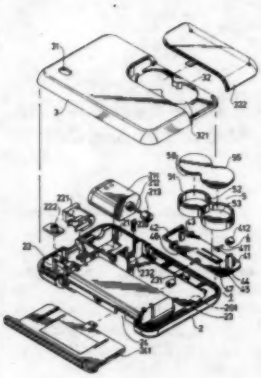
COMPACT, VIBRATING-TYPE CONTACT LENS CLEANER

Ching-Shih Chen, No. 18, Shuang-Hsi St., Sheh-Lin Dist., Taipei, Taiwan

Filed Nov. 28, 1989, Ser. No. 442,067

Int. Cl.[5] B08B *3/12*

U.S. Cl. 134—118 **2 Claims**



1. A contact lens cleaner comprising a base, a swingable vibrating plate with a free end mounted swingably on said base, a container mounted removably on said vibrating plate so as to receive an amount of a cleaning liquid and a contact lens therein, said container having two retaining notches formed in upper ends of two opposite side walls thereof, and said vibrating plate includes two gripping arms with barb-like ends projecting upward from an upper surface of said vibrating plate to engage said retaining notches with said barb-like ends of said gripping arms so as to retain said container on said upper surface of said vibrating plate; a motor disposed on said base so as to swing said vibrating plate, a cam member mounted rotatably on said base and having a cam surface which is engaged with said free end of said vibrating plate, and a resilient element biasing said free end of said vibrating plate toward said cam member, whereby, when said motor is started so as to rotate said cam member, said cam surface of said cam member

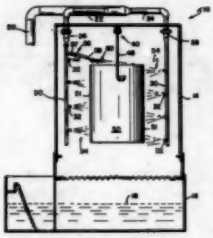
pushes said free end of said vibrating plate to move in one direction, while said resilient element moves said free end of said vibrating plate in the opposite direction to engage with said cam surface of said cam member, so as to swing said vibrating plate, thereby rinsing said contact lens with said cleaning liquid.

4,957,129

FLUID REMOVING APPARATUS

Kenneth N. Kraft, and R. Craig Allen, both of Evansville; Larry J. Schenk, Mount Vernon, all of Ind., assignors to George Koch Sons, Inc., Evansville, Ind.

Filed Jan. 6, 1989, Ser. No. 294,274
Int. Cl.[5] B08B 3/02
U.S. Cl. 134—151 **8 Claims**



1. An apparatus for removing excess solution from an article comprising a housing, means for spraying a high pressure liquid stream across a predetermined area inside the housing, the spraying means including a nozzle coupled to a liquid supply pipe, means for supplying liquid to the spraying means, and means for transporting an article having excess fluid on a portion of its exterior surface through the housing so that the portion of the exterior surface of the article having excess fluid thereon passes through the high pressure liquid stream, with the high pressure liquid stream forcing substantially all the excess fluid off the exterior surface of the article, the article including a top surface having an upwardly-turned outer edge forming a cavity which contains the excess fluid, the high pressure liquid stream being directed at the top surface of the article to force the excess fluid from the cavity as the article passes through the high pressure liquid stream.

4,957,130

CLEANING APPARATUS FOR CONTACT LENSES

Chien H. Lee, 3 Fl., No. 3, Alley 16 Lane 591, Sec. 1, Nei Au Rd., Taipei, Taiwan

Filed Aug. 9, 1989, Ser. No. 391,239
Int. Cl.[5] B08B 3/04
U.S. Cl. 134—158 **2 Claims**

1. A cleaning apparatus having a pair of containers for receiving contact lenses therein, comprising:

a cylindrical housing for containing a cleaning solution;

transmission means disposed within an enclosure for drivingly rotating said pair of containers;

plate means disposed within said enclosure for dividing said enclosure into an upper portion and a lower portion, said plate means including (1) a plate member having a through opening formed therein, and (2) a first spindle member fixedly coupled to said plate member adjacent said through opening;

said transmission means comprising:

(a) a main gear disposed within said upper portion of said enclosure and rotatably coupled to said first spindle member;

(b) spring means having one end coupled to said main gear and an opposing end coupled to said first spindle member for rotatably driving said main gear in a first direction subsequent to said main gear being rotatably driven in a second direction;

(c) an output gear disposed in said lower portion of said enclosure adjacent a bottom surface thereof, said output gear being coupled to a second spindle member, said second spindle member being coupled to said pair of containers for rotative displacement responsive to rotation of said output gear;

(d) compound gear means extending between said upper and lower portions of said enclosure through said

through opening of said plate member for providing rotative coupling between said main gear and said output gear; and,

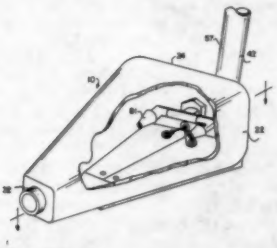
(e) a knob member having an internal circumferential toothed portion in meshing relationship with said main gear for manual rotative displacement of said main gear in said second direction, whereby said rotation of said knob member in said second direction stores energy in said spring means for driving said main gear in said first direction subsequent to a manual release of said knob member.

4,957,131

ANIMAL WASTE FLUSHING ASSEMBLY

James L. Robinson, 1421 N. 55th St., Philadelphia, Pa. 19131

Continuation-in-part of Ser. No. 137,239, Dec. 23, 1987, abandoned. This application Mar. 16, 1989, Ser. No. 324,393
Int. Cl.[5] B08B 3/02
U.S. Cl. 134—175 **24 Claims**



1. An assembly for flushing animal wastes from the ground, comprising:

a liquid supply tube with proximal and distal tube ends, said supply including

connect means at said proximal tube end to connect said supply tube with a source of fluid under pressure;

valve means along the liquid supply tube end to regulate flow of said fluid;

connect means at said distal tube end;

a domed waste enclosure connected to said distal end, and

having liquid sprayer means, and drain means, the drain means being disposed substantially at an end opposite from the sprayer means, the sprayer means directing a substantial portion of a liquid stream from the liquid supply tube through an opening defined under the domed waste enclosure, directly into said drain means, substantially parallel and adjacent to the ground when said enclosure is placed on the ground, whereby the enclosure can be placed over animal wastes on the ground, and the valve means opened, whereupon fluid from the supply breaks up the waste and flushes them through the drain means; and

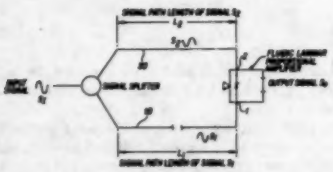
means for defining an enclosure extending at least partly under the animal wastes, whereby the animal wastes are at least partly confined in the enclosure under action of the spray means.

4,957,132

METHOD FOR LOW FREQUENCY ATTENUATION IN FLUIDIC AMPLIFICATION OF ACOUSTIC SIGNALS

Nasry Srour, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 12, 1989, Ser. No. 449,206
Int. Cl.[5] F15C *1/12*
U.S. Cl. 137—14 **8 Claims**



1. A method for adjustment of low frequency acoustic sound in an acoustic detector comprising the steps of:

collecting incoming sound waves in the frequency range of DC to 3000 Hz so as to provide an incoming signal S_I;

splitting said incoming signal into two signals S_1 and S_2 such that signal S_1 travels through a first acoustic transmission means a distance of L_1 to a first control port of a fluidic laminar proportional amplifier and signal S_2 travels through a second acoustic transmission means a distance of L_2 to a second control port of said fluidic laminar proportional amplifier;

adjusting said L_1 distance such that the phase of input signal S_1 is shifted in relation to the phase of input singal S_2 when said input signals S_1 and S_2 arrive at said control ports of said laminar proportional amplifier.

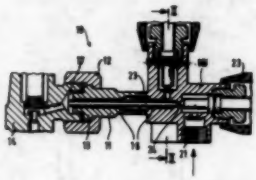
4,957,133

FLUSHING UNIT

Dieter Linz, Bad Soden, and Peter Elsner, Frankfurt, both of Fed. Rep. of Germany, assignors to Messer. Griesheim, Fed. Rep. of Germany

Filed Jul. 26, 1989, Ser. No. 385,189
Claims priority, application Fed. Rep. of Germany, Aug. 12, 1988, S810259[U]
Int. Cl.[5] B08B *9/06*; F17D *3/00*
U.S. Cl. 137—240 **7 Claims**

1. A flushing unit for gas cylinders comprising a solid unitary block housing, said housing having connecting means for connection to the cylinder valve of the gas cylinder, an extraction borehole in said housing, one end of said extraction borehole terminating at and communicating with the outlet of said cylinder valve, said extraction borehole having an outlet within said housing whereby a process gas may flow from said cylinder and through said extraction borehole when said cylinder valve is open, a process gas stop valve at the other end of said extraction borehole and being spaced from said cylinder valve in said housing selectively opening and closing said extraction borehole to selectively permit and prevent the process gas from being discharged from said extraction borehole, a flushing gas inlet in said housing, a flushing gas line in said housing located parallel to said extraction borehole over substantially the entire length of said flushing gas line, a flushing gas inlet stop valve in said housing adjacent said process gas stop valve in said housing selectively opening and closing said flushing gas line, said flushing gas line communicating with said flushing gas inlet and said cylinder valve, one end of said flushing gas line terminating at said cylinder valve outlet, a space being created in said housing at said outlet of said cylinder valve where said outlet of said cylinder valve communicates with said one end of said extraction borehole and said one



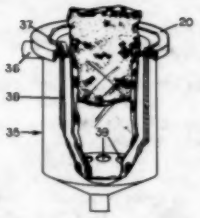
end of said flushing gas line, a flushing gas outlet in said housing communicating with said extraction borehole whereby said extraction borehole comprises an outlet passage for the flushing gas when the flushing gas enters said space, a flushing gas outlet stop valve adjacent said process gas stop valve in said housing selectively opening and closing said flushing gas outlet whereby a flushing gas may be supplied into said housing when said flushing gas outlet stop valve is open and said process gas stop valve is closed to flow through said flushing gas line and into said cylinder valve outlet at said space to mix with any process gas in said cylinder valve outlet and in said space and then flow out of said housing through said extraction borehole and said flushing gas outlet until all of the process gas has been displaced and whereby the space requirements and flushing gas requirements are minimized.

4,957,134

FERTILIZER CONTAINER FOR SPRINKLER SYSTEM

James R. Craig, 2925 Cody St., Riverside, Calif. 92503

Continuation-in-part of Ser. No. 78,165, Jul. 27, 1987, Pat. No. 4,750,512. This application Jun. 10, 1988, Ser. No. 205,062
Int. Cl.[5] B01D *11/02*
U.S. Cl. 137—268 **12 Claims**



1. A fertilizer applicator for a sprinkler system, comprising:

A. a screen for holding solid fertilizer, the fertilizer being contained in a water permeable bag;

B. a screen holder for containing the screen, including:

i. integrally formed upper and lower end flange members and sidewall elements joined thereto, the said elements providing openings for water to pass therethrough at a controlled rate and dissolve the fertilizer, the lower

flange member being perforated to permit water to drain therethrough; and,

ii. a bottom support member for the screen, the support member having a plurality of sized openings to permit dissolved fertilizer to pass therethrough at a controlled rate;

C. a case member, including:

i. a sidewall portion for enclosing the screen holder and contained screen therein;

ii. the case member being removeably secured to the upper flange member of the screen holder, thereby spacing the sidewall of the case member and the sidewall elements of the screen holder;

iii. the case member providing inlet and outlet means for water and diluted fertilizer solution, respectively, whereby:

i. water fed into the inlet will be pressured between the sidewall of the case, through the sidewall elements of the screen holder and into the screen to dissolve the fertilizer;

ii. water draining from the perforations in the lower flange member will dilute the dissolved fertilizer solution to reduce fertilizer burning; and,

iii. when the solid fertilizer is dissolved, water is passed principally through openings of the bottom support member and the outlet of the applicator, and then to the sprinkler system.

4,957,135

MIXING VALVE WITH VALVE PLATES PROVIDED WITH AN ATTACHMENT MECHANISM FOR THE FIXED PLATE TO PROVIDE A COMPRESSIVE FORCE

Alfons Knapp, Biberach/Riss, Fed. Rep. of Germany, assignor to Masco Corporation, Taylor, Mich.

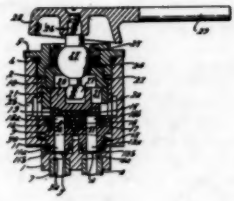
PCT No. PCT/US87/00542, § 371 Date Dec. 22, 1988, § 102(e) Date Dec. 22, 1988, PCT Pub. No. WO88/07151, PCT Pub. Date Sep. 22, 1988

PCT Filed Mar. 16, 1987, Ser. No. 378,528

The portion of the term of this patent subsequent to Sep. 9, 2003, has been disclaimed.

Int. Cl.[5] F16K *11/078, 25/00*

U.S. Cl. 137—454.6 **8 Claims**



1. A mixing valve comprising

a faucet body having a cartridge receiving chamber;

a cartridge housed in said cartridge receiving chamber and having a fluid receiving chamber and a support surface facing the fluid receiving chamber;

a valve plate fixedly mounted on the support surface;

a seal means interposed between the fixed plate and the support surface;

a movable valve plate in contact against said fixed valve plate and operably connected to a control means for moving said valve plate relative to said fixed valve plate;

compressive means for pressing the fixed valve plate against said support valve surface thereby compressing the seal means interposed between the fixed plate and said support surface independent of any smaller compressive forces exerted between said fixed plate and said movable plate.

4,957,136

NON-FLOWING MODULATING PILOT OPERATED RELIEF VALVE

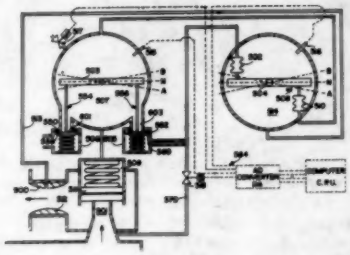
Gelu N. Gavrila, Parsipanay, N.J., assignor to Teledyne Industries, Inc., Los Angeles, Calif.

Continuation-in-part of Ser. No. 292,558, Dec. 30, 1988, Pat. No. 4,905,727. This application Apr. 11, 1989, Ser. No. 336,433

The portion of the term of this patent subsequent to May 6, 2006, has been disclaimed.

Int. Cl.[5] G05D *16/00*

U.S. Cl. 137—488 **89 Claims**



1. A pilot device for use in a relief valve system wherein said pilot device controls a piston-covers-nozzle type of main valve connected to a pressure system which is protected by the relief valve system, said pilot device being operable to control the pressure in a dome pressure chamber of the main valve with the dome pressure biasing the piston in the main valve to regulate fluid flow through the main valve, said pilot device comprising:

a housing having a first controlled pressure chamber and a second pressure chamber, said first controlled pressure chamber including a first pressure inlet port, a second pressure venting port, a third dome pressure communication port and a fourth pressure transducer feedback port;

a torsion device adapted to assume a pre-set torque position;

first and second pressure transducers located in said second pressure chamber, said first and second pressure transducers being in communication with said torsion device, and said first pressure inlet port communicating with both the pressure system protected by the relief valve system and said second pressure transducer, and said second pressure venting port adapted to vent pressurized fluid in said first controlled pressure chamber to a venting area;

follower means for opening and closing said first pressure inlet port and said second pressure venting port, and said follower means being responsive to movement of said torsion device;

said third dome communication port connecting said first controlled pressure chamber to the dome pressure chamber of the main valve;

said fourth pressure transducer feedback port being in communication with said first pressure transducer so as to provide a first feedback line;

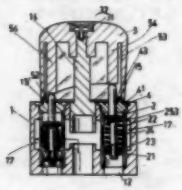
said first pressure transducer having means for sensing pressure variations in said first controlled pressure chamber and means for applying torque to said torsion device in response to pressure variations in said first controlled pressure chamber;

said second pressure transducer having means for sensing pressure variations in the pressure system protected by the pilot operated relief valve, and means for applying torque to said torsion device in response to the sensed pressure variations of the pressure system protected by the pilot operated relief valve.

4,957,137
HOT/COOL WATER REGULATING FAUCET

Hong-Shang Wang, No. 70, Lane 139, Lien Cheng Road, Chungho, Taipei Hsien, Taiwan

Filed Mar. 8, 1989, Ser. No. 320,445
Int. Cl.[5] F16K 11/16
U.S. Cl. 137—549 6 Claims



1. A hot/cool water regulating faucet, comprising:

a housing, having two cross shaped openings, said cross shaped openings each comprising an inner thread at the top and being respectively in communication with an associated water inlet and water outlet, said housing also comprising a main shaft at the center, said main shaft having a thread hole;

two sleeves being set in said two cross shaped openings respectively, said two sleeves each comprising a plurality of holes at the middle portion and having a movable axle thereinside for mounting thereon of a spring to further be connected with a rubber cock and a metal cap and screwed up with a nut;

two stepped upper caps to match with said two sleeves, said two stepped upper caps each having an outer thread and a central hole to allow the associated movable axle to be inserted into said central hole so as to confine the associated sleeve in the associated cross shaped opening of said housing;

a cover knob, comprising two grooves, a retainer means, and two tracks, said two tracks being to control said two movable axles of said two sleeves respectively;

said two sleeves are respectively set in said two cross shaped openings of said housing and said cover knob is fixedly mounted on said main shaft such that the revolving of said cover knob drives said two tracks to push said two movable axles of said two sleeves to move so as to simultaneously control the water flow rate of hot water and cool water.

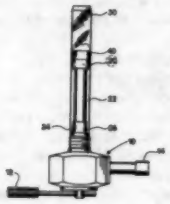
4,957,138
ANTI-SIPHONING DEVICE FOR A RESERVE METERING VALVE

Wayne H. Pingel, and Donna M. Pingel, both of Rte. 1, Box 303, Grand Marsh, Wis. 53936

Filed Nov. 10, 1987, Ser. No. 119,077
Int. Cl.[5] E03B 3/18
U.S. Cl. 137—549 9 Claims

1. An anti-siphon device for attachment to a reserve metering valve having a standpipe with an orifice at its upper extremity and a filter screen surrounding the standpipe to prevent the siphoning of liquid upwards on the filter screen surrounding the standpipe comprising:

a sleeve member arranged to circumscribe the standpipe and mounted proximate the upper extremity of the standpipe

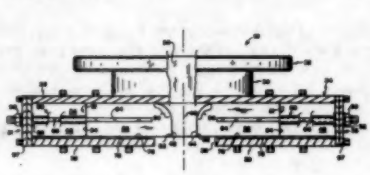


in contact with the screen, and extending above and below the standpipe orifice.

4,957,139
LOW-NOISE NOZZLE VALVE

Hal S. Gwin, Madison, and James R. Aaron, Athens, both of Ala., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Sep. 7, 1989, Ser. No. 404,290
Int. Cl.[5] F16K 3/32, 37/00, 3/316
U.S. Cl. 137—556 6 Claims



1. A low-noise, variable discharge area, split gate valve comprising:

a valve housing having a fluid entrance opening and a fluid exit opening, said openings being aligned about a common axis;

a pair of opposed, elongated recesses in said housing, with said axis passing therebetween, with each interior side of each said recess provided with a spline longitudinally disposed therein, and each said recess having an end wall;

facing gates movably disposed in each recess, each said facing gate having a forward edge provided with a radiused upstream region for smoothyl accelerating fluid passing therebetween;

a groove longitudinally disposed on each narrow side of said gates and disposed to slidably receive the splines, and a sheet of material having a low coefficient of friction disposed on a lower surface of each said recess adjacent to said exit opening for enabling smooth movement of the gates in said recesses; and

means for moving each said gate inward or outward with respect to said axis, thereby closing or opening said valve.

4,957,140
HYDRAULIC PRESSURE CONTROL VALVE FOR USE WITH BRAKE MASTER CYLINDER

Ichiro Ishiwata, Yokosuka, Japan, assignor to Nippon Air Brake Co., Ltd., Japan

Filed Apr. 14, 1989, Ser. No. 337,955
Int. Cl.[5] G05D 16/04
U.S. Cl. 137—505.25 10 Claims

1. A hydraulic pressure control valve for use with a brake master cylinder, comprising:

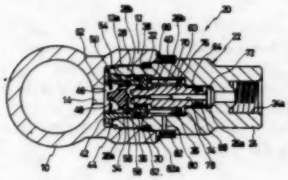
a hollow body of one-piece structure having an outlet bore

and an inlet formed respectively in one and other ends of said body, said body having an internal stepped bore which extends between said outlet bore and said inlet bore and through which said outlet bore and said inlet bore communicate with each other, said body being provided, adjacent the other end thereof, with a mounting portion to said master cylinder;

a piston arranged in said stepped bore of said body for reciprocative movement along said stepped bore in response to hydraulic pressure introduced into said body from said master cylinder, said piston being formed therein with a passage through which said outlet bore and said inlet bore communicate with each other, said piston having one end thereof remote from said outlet bore, whose end face serves as a valve seat;

spring means arranged within said body for biasing said piston toward said outlet bore;

a substantially tubular cap element arranged in said inlet



bore for substantially closing said stepped bore, wherein said cap element supports said one end of said piston, and wherein said cap element has an inner peripheral surface thereof which defines a valve chamber;

fixing means arranged between said cap element and said body for fixing said cap element to said body without being accompanied with rotation of said cap element and said body relative to each other, wherein said fixing means is formed by caulking of one of said body and said cap element to the other; and

a valve element arranged within said valve chamber in facing relation to said valve seat provided at the one end of said piston, wherein said valve element is normally spaced away from said valve seat, but is seated on said valve seat when said hydraulic pressure reaches a predetermined level to move said piston toward said valve element against biasing force of said spring means, thereby causing said valve element to close said passage in said piston.

4,957,141

PIPE-END PROTECTOR

Wilfried Dreyfuss, Dorfstrasse 52, D-3111 Elmke, Fed. Rep. of Germany; Thomas E. Remp, 5555 Del Monte Dr., Houston, Tex., and Kurt Müller, Eicklingen, Fed. Rep. of Germany, assignors to Wilfried Dreyfuss, Elmke, Fed. Rep. of Germany and Thomas E. Remp, Houston, Tex.

Filed Jun. 29, 1988, Ser. No. 212,795

Int. Cl.[5] B65D *59/06*; F16L *55/10*

U.S. Cl. 138—89 **1 Claim**

1. A protector for the threads of a pipe-end, comprising:

(a) a longitudinally extending metallic tubular member;

(b) an elastomeric sleeve adapted to engage the threads of a pipe-end and affixed co-axially and co-extensively relative to said tubular member, thereby forming a unit;

(c) means for securing said sleeve to said tubular member;

(d) said unit having first and second spaced end portions;

(e) said unit first end portion including an annular groove;

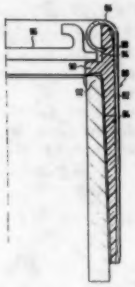
(f) an elastic lid removably secured to said annular groove;

(g) said sleeve is disposed within said tubular member;

(h) said tubular member including a first end portion curved inwardly;

(i) said tubular member including an edge section extending transversely thereto and engaging an end portion of said sleeve, thereby securing said sleeve to said tubular member;

(j) said sleeve including a radially extending annular flange



adjacent said tubular member first edge section for engaging an end portion of the pipe-end; and

(k) said flange is spaced from said tubular member edge section, thereby forming said annular groove.

4,957,142

TENSION LEVER FOR NEGATIVE DOBBY

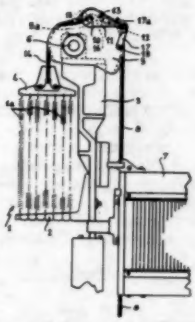
Louis Houlon, Duingt, France, assignor to S.A. des Etablissements Staubli (France), Faverges, France

Filed Mar. 21, 1989, Ser. No. 326,562

Claims priority, application France, Mar. 31, 1988, 88 04569

Int. Cl.[5] D03C *13/00*

U.S. Cl. 139—88 **8 Claims**



1. In a drawing system for controlling the heddle frames of weaving mechanisms of the negative type and which includes for each heddle frame at least one elongated transmission element having a length dimension, said transmission element having one of the end portions thereof attached to a mobile member for actuating the mechanism and an opposite end portion which is assoicated with a register of springs which act to return the heddle frame after it has been moved, the improvement comprising, a tension lever member, first pin means for connecting said tension lever member to and along the length of the transmission element, second pin means for pivotally mounting said tension lever member about an axis oriented transversely to the length of the transmission element, said first pin means spaced from said second pin means and being relative movable with respect to said second pin means as said tension lever member is pivoted about said second pin means

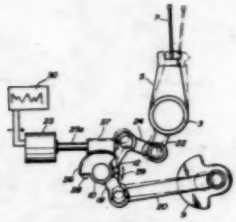
between a first and second position, said tension lever member being moveable to selectively tension and relax the springs of the register.

4,957,143

REED OPERATING SYSTEM FOR LOOM

Takao Takahashi, Hachioji; Takatsugu Kato, and Shigero Terushima, both of Tokyo, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jul. 1, 1988, Ser. No. 213,955
Claims priority, application Japan, Jul. 8, 1987, 62-103798[U]
Int. Cl.[5] D03D *49/00*
U.S. Cl. 139—190 **6 Claims**



1. A reed operating system for a loom, comprising:
a crank for driving a reed between an advance position and a backdown position;
a swingable link through which said sley sword is connected to said crank;
a pivot shaft on which said swingable link is mounted so as to be swingably rotatable around an axis of said pivot shaft, said pivot shaft including a first shaft section, and a second shaft section on which said link is mounted, said second shaft section being eccentric relative to said first shaft section;
pattern means;
means for shifting and fixing location of said pivot shaft in a predetermined distance in a predetermined direction in accordance with a predetermined pattern whereby the advance position of the reed can be changed without substantially changing the backdown position, said pivot shaft location shafting and fixing means including a servo-motor, means for driving said servo-motor in accordance with said predetermined pattern, a sector gear fixed to said pivot shaft first section, and a worm gear engaged with said sector gear and driven by an output shaft of said servo-motor.

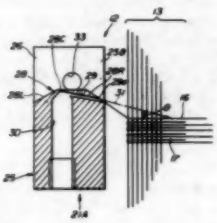
4,957,144

TACK-IN SYSTEM OF SHUTTLELESS LOOM

Tetsuji Watanabe, Tokyo; Hidetsugu Umezawa, Higashiyamato, and Sigenori Tanaka, Tokyo, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Dec. 27, 1988, Ser. No. 289,802
Claims priority, application Japan, Dec. 28, 1987, 62-335468; Mar. 31, 1988, 63-42014[U]; Jul. 4, 1988, 63-87941[U]; Jul. 6, 1988, 63-166953; Jul. 22, 1988, 63-97047[U]
Int. Cl.[5] D03D *47/48*
U.S. Cl. 139—434 **23 Claims**

1. A tack-in system of a shuttleless loom having means for picking a weft yarn into a shed of warp yarns, said tack-in system comprising:
means defining a slit located near an edge of an array of the warp yarns, the weft yarn picked from the weft picking means being extended through said slit;
means for cutting the weft yarn picked from the weft picking means;
means for holding an end section of the picked and cut weft yarn having at least a part of said end section located within said slit, said end section projecting from an edge of a woven fabric;
means defining a fluid jet nozzle having an opening from which a fluid jet is ejected;
means for locating an opening of said nozzle such that the



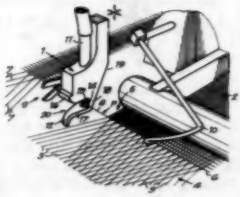
fluid jet therefrom blows the picked and cut weft yarn end section held by the holding means; and
means for directing the fluid jet from said fluid jet nozzle so that an axis of the fluid jet crosses a cloth fell at an acute angle when projected on a horizontal plane passing through said cloth fell.

4,957,145

PNEUMATIC WEFT THREAD HOLDER FOR A SELVAGE DEVICE

Eddy Verclyte, Ieper; Ignace Meyns, Reninge, and Patrick Glorie, Ieper, all of Belgium, assignors to Picanol N.V., Belgium

Filed Jun. 26, 1989, Ser. No. 371,029
Claims priority, application Belgium, Jun. 29, 1988, 8800746
Int. Cl.[5] D03D *47/38, 47/48*
U.S. Cl. 139—434 **2 Claims**



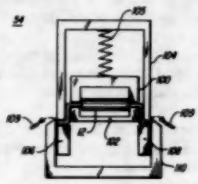
1. A pneumatic weft holder for a weaving machine selvedge device including a tucking needle which passes on one side of said holder during a selvedge forming operation, comprising a blower nozzle; means on a side of said nozzle located in a blowing direction of said blower nozzle for supporting said weft thread, said support means being located between said blower nozzle and said one side of the holder passed by the tucking needle; and an opening in the support means which is in line with the blowing direction of said blower nozzle, wherein said opening has means including an enlargement transverse to the blowing direction of the blower nozzle for permitting air to escape when said tucking needle passes on said one side of the holder, thereby preventing air current fluctuations caused by said needle from disturbing the position of said thread.

4,957,146

FLATPACK PREPARATION MACHINE

Nathaniel J. Satterfield, Anderson, S.C.; J. Gregg Ellis, Indian Harbour Beach, and Leonard T. Hesch, Jr., Palm Bay, both of Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Mar. 6, 1989, Ser. No. 319,036
Int. Cl.[5] B21F *45/00*
U.S. Cl. 140—105 **10 Claims**



1. A process for forming the leads of an integrated circuit having a body and a plurality of leads extending therefrom, including the steps of:

(a) clamping each lead between the body and the lead portion to be formed;

(b) bending each lead downwardly to form a first lead segment forming an angle of between approximately 45 degrees and approximately 90 degrees with the body;

(c) for each lead, bending a portion of the first lead segment outwardly to form an approximately horizontal second lead segment; and

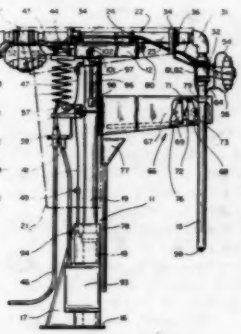
(d) cutting each lead vertically upward to remove a predetermined portion of said second lead segment.

4,957,147

CONTAINER FILLING APPARATUS

Terry B. Lowe, 133 Pagosa Way, Fremont, Calif. 94539

Filed Oct. 1, 1987, Ser. No. 103,519
Int. Cl.[5] B65B *3/28*
U.S. Cl. 141—83 **11 Claims**



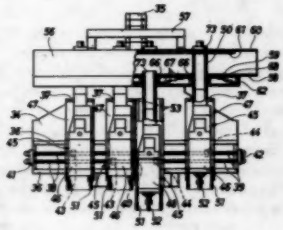
1. In apparatus for filling a container with a liquid: a base, an arm mounted on the base for movement between raised and lowered positions, a filling lance carried by the arm for introducing the liquid into the container, a first sensing tube carried by the lance and having a discharge opening which is normally positioned above the level of the liquid in the container, a second sensing tube having a discharge opening positioned below the discharge opening in the first named sensing tube and normally below the level of the liquid in the container, means for introducing a fluid into the sensing tubes, means for withdrawing the lance from the container as the container is filled, means for monitoring the pressure of the fluid in the sensing tubes, and means responsive to the pressure of the fluid in the tubes for increasing the rate at which the lance is removed in the event of an increase in the pressure in the first tube and decreasing the rate at which the lance is removed in the event of a decrease in the pressure in the second tube.

4,957,148

CHIP REMOVING DEVICE FOR MULTI-HEAD MACHINE TOOL

Isao Shoda, 1116-4, Okabe-cho, Hamamatsu, Shizuoka, Japan

Filed Oct. 27, 1989, Ser. No. 427,400
Claims priority, application Japan, Nov. 2, 1988, 63-143961[U]; Apr. 5, 1989, 64-86068
Int. Cl.[5] B27G *19/00*
U.S. Cl. 144—252 R **5 Claims**



1. A chip removing device for a multi-head machine tool comprising:

a ram;

a plurality of working heads, each including a motor and individually movably mounted on the ram;

individual head holders for moving the heads in horizontal opposite directions;

an actuator for moving each of the heads selectively between an upper position and a lower position;

means for defining a suction air passage around each said motor;

a connecting pipe extending from an upper portion of each of said working heads;

a horizontally extending common duct, connected commonly to each said connecting pipe, for causing a vacuum sucking action to act upon said working heads therethrough to collect chips produced by said working heads, said duct having a horizontally elongated slit formed in a lower wall thereof;

expansible shutter means for normally closing said slit of said common duct, upper end portions of said connecting pipes extending in an airtight condition through said shutter means into said duct, said shutter means opening and closing in response to horizontal movement of said working heads such that, when one of said working heads is moved in one of said horizontal opposite directions, said shutter means is partially expanded and contracted on opposite sides of said one of said working heads; and

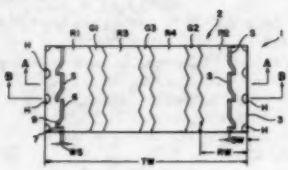
a horizontally elongated seal plate, secured horizontally within said duct and disposed commonly to said working heads such that, when each of said working heads is at the upper position, said connecting pipe of said one of said working heads is pressed at an upper end opening thereof against said seal plate so that said upper end opening is closed in an airtight condition by said seal plate, but when the working head is at the lower position, said upper end opening of said connecting pipe is spaced away from said seal plate and is in an open condition.

4,957,149

PNEUMATIC TIRE TREAD WITH PLURAL OVERLAPPING NARROW GROOVES IN SHOULDER

Muneori Iuchi, Kobe, Japan, assignor to Sumitomo Rubber Industries, Ltd., Japan

Filed Jan. 31, 1989, Ser. No. 304,194
Claims priority, application Japan, Feb. 1, 1988, 63-22447
Int. Cl.[5] B60C *11/06*
U.S. Cl. 152—209 R **7 Claims**



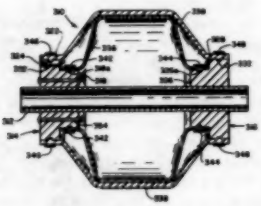
1. A pneumatic tire having a tread region and a pair of shoulder regions, one extended radially inwardly from each tread edge, said tread region provides with a pair of circumferentially extending shoulder ribs, said shoulder regions being provided with buttress hollows arranged circumferentially at intervals, one of said shoulder ribs being provided with a plurality of circumferentially extending narrow grooves, said narrow grooves arranged in the circumferetial direction of the tire so that the circumferentially adjacent narrow grooves are overlapped with each other at their end portions, the locations of the overlaps in said narrow grooves being coincident with the locations of the buttress hollows in the circumferential direction of the tire, each of said narrow grooves comprising a long main portion, a short overlap portion and an inclined portion extending therebetween to connect the overlap portion with the main portion, and said main portion and said overlap portion extending in parallel to ghe circumferential direction of the tire, and said inclined portion being inclined with respect to the circumferential direction of the tire and connecting said overlap portion with said main portion.

4,957,150

LINEAR TIRE

Louis A. Dionisio, 750 S. Pecan St., Lindenhurst, N.Y. 11757, and Philip Dionisio, 228 Bayview Dr., Mastic Beach, N.Y. 11951

Filed Jan. 23, 1989, Ser. No. 299,907
Int. Cl.[5] B60C *5/00, 3/04*
U.S. Cl. 152—454 **4 Claims**



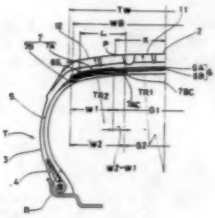
1. A wheel and tire assembly for a vehicle comprising:
a. means forming a cylindrical hub;
b. a pair of spaced flanges mounted on said hub, each of said flanges including a cylindrical collar;
c. an inner liner comprising a continuous sheet of inflatable material surrounding and extending between the collars of said flanges;
d. jacket means surrounding said inner liner capable of taking a predetermined shape upon being expanded by the inflation of said continuous sheet;
e. an outer tire casing means enclosing said jacket means for being expanded into the shape of said jacket means upon the latter being expanded by the inflation of said inner liner and thereafter functioning as a tire;
f. sealing means mounted on each said collar to prevent air from escaping from within said inner liner;
g. opening means in one of said flanges for permitting gas under pressure to be injected into said inner liner for inflation thereof;
h. said sealing means comprising external bead means for retaining said inner liner, jacket means, and casing means on said flanges and preventing loss of air under pressure from said inner liner;
i. said external bead means comprising straps for clamping the ends of said inner liner, jacket means and casing means on each said collar and;
j. said opening means comprising a passageway to permit gas under pressure to be injected, said passageway being sealed closed by tightening the strap on the flange containing said passageway.

4,957,151

RADIAL TIRE FOR PASSENGER CARS INCLUDING FOLDED BAND LAYER AT THE BELT EDGES

Kenji Takehara, Kobe, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

Filed Jun. 17, 1988, Ser. No. 207,964
Claims priority, application Japan, Jun. 17, 1987, 62-152321
Int. Cl.[5] B60C *3/00, 9/28*
U.S. Cl. 152—454 **2 Claims**



1. A radial tire for passenger cars comprising:
a bead core disposed in each bead portion of the tire;
a carcass having a ply of radially arranged cords both ends of which are turned up around the bead cores;
a tread disposed on the carcass;
a belt layer having two plies of steel cords disposed between the carcass and the tread; and
a band layer disposed at each edge of the belt layer and turned back on itself to form an upper portion disposed radially outside the belt layer and a lower part disposed radially inside the belt layer, said band layers being composed of organic fiber cords inclined at 5 to 45 degrees to the circumferential direction of the tire,
the band layers being axially separated from each other between the upper portion and the lower portion, and the gap between the upper portion being in a range of 35 to 65% of the width of the belt layer,
the width of the lower portion of each band layer being 5 to 20 mm larger than the width of the upper portion thereof,
the tread, in a state that the tire is mounted on a regular rim and inflated to 5% of a regular internal pressure, provided with a tread face composed of a central arc portion with a radius of curvature (TR1) and a pair of lateral arc portions with a radius of curvature (TR2) located one on each side of the central arc portion,
the ratio (TR2/TR1) of the radius of curvature (TR2) of the

lateral arc portions to the radius of curvature (TR1) of the central arc portion being in a range of 0.15 to 0.45, and

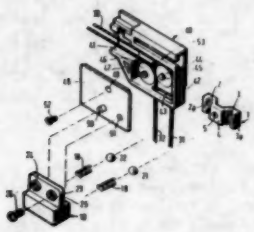
a connection between the internal arc portion and each external arc portion located axially outward of the axially inner edge of the lower part of each band layer and axially inward of each edge of the overlap of the two belt plies.

4,957,152

CORD TENSIONING DEVICE

Peter E. Knight, Walsall, and John E. Lyons, Burton-on-Trent, both of United Kingdom, assignors to Swish Products Limited, Staffordshire, England

Filed May 2, 1988, Ser. No. 189,155
Int. Cl.[5] A47H *5/00*
U.S. Cl. 160—345 **8 Claims**



1. A device for maintaining tension in two runs of a cord, said runs of cord having at one end of the run a first means about which a cord is looped to provide the said runs of cord and at the other end second means over which the said runs of cord pass to provide end portions extending downwardly of said runs, said device comprising:

a first member containing two parallel open channel means to receive a respective downwardly extending end portion of each of said runs of cord,

a second member at least partially closing each said channel to retain said end portions in their respective channels, and

resilient pressure means acting between said second member and said end portions to urge each said end portion into frictional contact with a wall of its respective channel means opposite said second member,

whereby the runs of the cord may be tensioned by the application of a tensioning force to one or both of said downwardly extending end portions,

and the said runs of cord remaining in a tensioned condition when the said tensioning force is removed.

4,957,153

COUNTERGRAVITY CASTING APPARATUS AND METHOD

George D. Chandley, Amherst, N.H., assignor to General Motors Corporation, Detroit, Mich.

Filed May 2, 1989, Ser. No. 346,627
Int. Cl.[5] B22C *9/04*; B22D *18/06*
U.S. Cl. 164—7.1 **55 Claims**

1. Apparatus for countergravity casting of molten metal, comprising:

(a) a container having an open bottom end,

(b) a gas permeable, self-supporting mold disposed in the container, said mold including a mold cavity and molten metal inlet means communicating with the underside of said mold for admitting the molten metal into the mold cavity from an underlying molten metal pool,

(c) a particulate bed compacted in the container about the mold, and

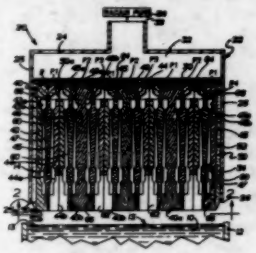
(d) means for establishing a negative differential pressure between the inside and the outside of the container sufficient to hold the particulate bed about the mold before, during and after filling of the mold cavity with metal.

37. A method of countergravity casting of molten metal, comprising:

(a) positioning a gas-permeable, self-supporting mold in a container having an open end, said mold having a mold cavity therein and molten metal inlet means communicating said mold cavity with the underside of said mold,

(b) compacting a particulate bed about said mold in said container,

(c) establishing a sufficient negative differential pressure between the inside and the outside of the container to hold



the particulate bed in the container about the mold when the open end thereof faces an underlying molten metal pool,

(d) orienting the container such that the open end of the container and said molten metal inlet means of the mold face said pool,

(e) relatively moving the underlying molten metal pool and the container to immerse said molten metal inlet means in said pool, and

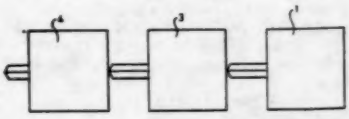
(f) drawing the molten metal upwardly through the molten metal inlet means into said mold cavity to fill said mold cavity with said molten metal when the molten metal inlet means is immersed in the pool.

4,957,154

PROCESS FOR THE IN-LINE HOMOGENIZATION AND RECRYSTALLIZATION OF METALLIC PRODUCTS OBTAINED BY CONTINUOUS CASTING

Gérard Durand-Texte, Aubervilliers, France, assignor to Etablissments Griset, Aubervilliers, France

Filed May 8, 1989, Ser. No. 348,816
Claims priority, application France, Jun. 3, 1988, 88 07432
Int. Cl.[5] B22D *11/12*
U.S. Cl. 164—476 **3 Claims**



1. A process for the in-line homogenization and recrystallization of a continuous casting product, comprising:

(a) providing a continuous casting product including an alloy having a plurality of phases therein disposed proximate to the surface of said product;

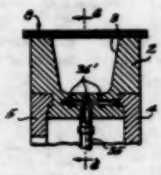
(b) forming a plurality of voids at least near said surface by superficially cold-working said product; and

(c) homogenizing at least said surface by heat treating said product, and substantially reducing at least one of said phases whereby a portion of said voids assist in accelerating a diffusion of a portion of said phases into said alloy.

4,957,155
COOLING SYSTEM FOR CONTINUOUS CASTING MACHINES

Zdenek Truka, 5413 126th Pl. S.E., Bellevue, Wash. 98006

Filed Aug. 4, 1988, Ser. No. 228,614
Int. Cl.[5] B22D *15/00, 11/00*
U.S. Cl. 164—482 51 Claims



1. In a continuous casting machine having a rotatable casting wheel with a peripheral groove forming a continuous outward-opening mold cavity, band means for closing a segment of such mold cavity, the band means including a first portion approaching the casting wheel to a point of engagement therewith, an elongated second portion extending from said first portion and looped around the casting wheel, such elongated second portion having its width extending across, overlying and closing the mold cavity, and a third portion extending from said second portion and departing from the casting wheel, means for introducing molten metal into the casting wheel peripheral groove adjacent to the point of engagement of the band means first portion with the casting wheel for solidification thereof during rotation of the casting wheel through the segment closed by the band means second portion and means for cooling the casting wheel in such segment closed by the band means second portion for extraction of heat to promote solidification of the metal, the improvement comprising means for deterring heat transfer from the metal to the band means throughout a central portion and substantially the entire width of the band means second portion which closes the mold cavity for a substantial portion of the length of the band means second portion so as to induce solidification of the metal in the area adjacent to the casting wheel cooled by the cooling means more than adjacent to such substantial portion of the length of the band means second portion, whereby the metal solidifies in a direction outward from the casting wheel toward the band means more than would occur if heat transfer were promoted uniformly around the circumference of the metal in the mold cavity.

4,957,156
CONTINUOUS CASTING MOLD ARRANGEMENT FOR CASTING BILLETS AND BLOOMS

Karl Mayrhofer, Naarn, Austria, assignor to Voest-Alpine Industrieanlagenbau Gesellschaft m.b.H., Austria

Filed Jun. 5, 1989, Ser. No. 361,149
Claims priority, application Fed. Rep. of Germany, Jun. 8, 1988, 3819493
Int. Cl.[5] B22D *11/10*
U.S. Cl. 164—504 5 Claims

1. In a continuous casting mold arrangement for casting billets and blooms of the type including a continuous casting mold having an upper end or run-in side and a lower end or run-out side defining a mold cavity therebetween, and a stirring means adapted to generate a rotating electromagnetic field of force, the improvements wherein:

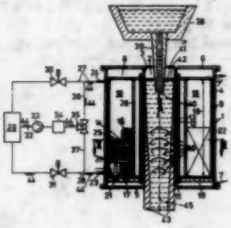
(a) said continuous casting mold is adapted to facultatively provide for casting by the free-stream casting technique or by the immerged-tube casting technique and comprises at least one stirring means displaceable over the height of said continuous casting mold and fixable in different height positions;

(b) a mold internal space extending approximately over the height of said continuous casting mold;

(c) a coolant flowing through said mold internal space and said stirring means being arranged within said mold internal space;

(d) a substantially closed casing inserted in said mold internal space through which said coolant flows, said stirring means being arranged within said closed casing;

(e) a stirring means coolant flowing through said closed casing;



(f) at least one first coolant duct entering into said closed casing near its lower end and at least one second coolant duct entering into said casing near its upper end, wherein said closed casing has an interior extending over almost the entire height of said continuous casting mold and said stirring means is displaceable in height within said interior; and

(g) further comprising valve means valve means for controlling the supply and discharge of said stirring means coolant and for fixing the height position of said stirring means by creating a differential pressure of said stirring means coolant above and below said stirring means.

4,957,157
TWO-PHASE THERMAL CONTROL SYSTEM WITH A SPHERICAL WICKED RESERVOIR

Mack W. Dowdy, LaCanada, Calif., and Donald J. Benko, Princeton, N.J., assignors to General Electric Co., New York, N.Y.

Filed Apr. 13, 1989, Ser. No. 337,774
Int. Cl.[5] F28D *15/02*
U.S. Cl. 165—104.27 17 Claims

1. A capillary-pumped thermal control system for pumping fluid coolant around a closed loop, said system being usable in microgravity and also being capable of being tested in a gravity environment, comprising:

an evaporator for absorbing heat and using the absorbed heat to vaporize said coolant to produce coolant vapor near a preselected pressure,

at least one condenser coupled to said evaporator for receiv-

ing said coolant vapor, said condenser including a heat rejecting radiator for absorbing heat from said coolant vapor and for transferring said heat to the surroundings by thermal radiation to cause said coolant vapor to revert to liquid form, whereby when said condenser is exposed to a relatively warm environment, the ratio of the volume of liquid coolant to coolant vapor in said condenser is relatively small, and when said condenser is exposed to a relatively cold environment, said ratio is larger, which tends to change the amount of liquid in said closed loop and thereby change said preselected pressure;

a liquid path for coupling said liquid coolant to said evaporator;

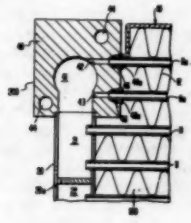
a closed spherical reservoir coupled by a pipe to said liquid path of said closed loop, said spherical reservoir including a wall defining a first hemisphere which in a Earth gravity environment is the upper hemisphere and also defining a second hemisphere opposite said first hemisphere, at least a portion of the exterior of said wall of said upper hemisphere being thermally exposed to allow thermal radiation and at least a portion of said wall of said upper hemisphere being coupled to controllable heaters, the interior surface of said wall being in thermal contact with a thin wick at least in the vicinity of those regions of said wall which are exposed for thermal radiation and in those regions to which said heaters are coupled, said pipe opening into said wall of said reservoir at the center of said lower hemisphere, and communicating with a standpipe, which standpipe extends from said wall at said pipe opening in a radial inward direction about to the center of said spherical reservoir to thereby define a principal axis of said reservoir, said spherical reservoir further including a plurality of fins extending along and supported by said standpipe, said fins being made from a material which is wetted by said coolant, each of said fins extending away from said axis defined by said standpipe.

4,957,158

HEAT EXCHANGER

Nobuyasu Ando, Takasaki, Japan, assignor to Sanden Corporation, Isesaki, Japan

Filed Jan. 30, 1990, Ser. No. 472,638
Claims priority, application Japan, Jan. 30, 1989, 1-8229[U]
Int. Cl.[5] F28F *9/02*
U.S. Cl. 165—110 **16 Claims**



1. In a heat exchanger for a refrigerant fluid circuit, said heat exchanger comprising a plurality of tubes having opposite first and second open ends, a plurality of fin units disposed between said plurality of tubes, said tubes and fin units jointly forming a heat exchange region, first and second header pipes, each of said header pipes having an open end and fixedly and hermetically coupled to one of said opposite ends of each of said tubes to allow said tubes to communicate with the interior of said header pipes, at least one of said header pipes having means for linking said heat exchanger to an external element of said refrigerant fluid circuit, the improvement comprising:

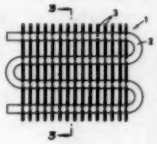
said linking means including a block member located at an inner side of a corner of the heat exchanger defined by the open end of one of said first and second header pipes and said heat exchange region for sealing the open end of said one of said first and second header pipes, said block member having a cavity formed therein, said cavity opening to the interior of said one of said first and second header pipes, and communicating with the interior of at least one of said tubes, said cavity further opening to an outer surface of said block member to communicate with said external element of said refrigerant fluid circuit.

4,957,159

ALUMINUM HEAT EXCHANGER PROVIDED WITH FINS HAVING HYDROPHILIC COATING

Masaaki Mizoguchi; Susumu Inoue; Tatsuo Otsuka, and Eizo Isoyama, all of Sakai, Japan, assignors to Showa Aluminum Corporation, Sakai, Japan

Continuation-in-part of Ser. No. 32,256, Mar. 31, 1987, abandoned. This application Mar. 15, 1989, Ser. No. 323,741
Claims priority, application Japan, Apr. 3, 1986, 61-77830
Int. Cl.[5] F28F *13/18*
U.S. Cl. 165—133 **11 Claims**



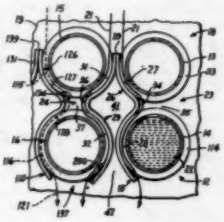
1. A heat exchanger made of aluminum and comprising a tube and fins attached to the tube, wherein the fins are coated with a composition consisting essentially of an alkali silicate, an inorganic hardening agent and a water-soluble high-molecular-weight organic compound.

4,957,160

SELF-CLAMPING BAFFLE FOR TUBULAR STRUCTURES

William F. Raleigh, Santa Clarita, Calif., assignor to Gas Research Institute, Chicago, Ill.

Filed Dec. 4, 1989, Ser. No. 445,281
Int. Cl.[5] F28F *9/22*
U.S. Cl. 165—160 **23 Claims**



1. A baffle for a tubular structure of at least two pairs of spaced tubes, comprising in combination:

a first baffle sheet having two portions curved in accommodation of spaced tubes in one of said pairs; and

a second baffle sheet having another two portions curved in accommodation of spaced tubes in the other of said pairs when said baffle is inserted in between said two pairs of spaced tubes;

said first and second baffle sheets being structurally interconnected and biased away from each other for self-clamping retention between said two pairs of spaced tubes.

4,957,161

DEVICE FOR PUMPING A FLUID AT THE BOTTOM OF A WELL

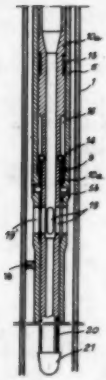
Henri Cholet, Le Pecq, and Edmond Chanton, Clamart, both of France, assignors to Institut Francais du Petrole, Malmaison, France

Continuation-in-part of Ser. No. 213,239, Jun. 29, 1988, abandoned. This application May 15, 1989, Ser. No. 352,017

Claims priority, application France, Jun. 30, 1987, 87 09231

Int. Cl.[5] F04B 47/14

U.S. Cl. 166—105 **11 Claims**



1. A device for pumping a fluid at a bottom of a well extending down from a surface, said device comprising tubing disposed vertically within the well and having a lower end part plunging into the fluid and an upper end which opens out on the surface and through which upper end the fluid is discharged, a pump seat connected to the lower part of the tubing, a gear pump being on the pump seat inside the tubing and comprising a pump case having a lower portion and an inner volume which communicates with an inner volume of the tubing, at least one stator fixed in the case and at least one helical rotor rotatively mounted in the stator, means for driving the rotor, and means for raising and suspending the pump in the tubing, said driving and raising means being actuatable from the surface, the pump seat having a tubular shape and including on an inner surface thereof, a bearing portion for the pump case, a bore downwardly extending the bearing portion axially of the tubing and having a reduced diameter relative to an inside diameter of the tubing and opening onto the fluid and constituting a cavity for the lower portion of the pump case in which the fluid is aspirated, wherein the lower portion of the pump case is connected to a cylindrical heavy body having a diameter less than the diameter of the bore of the pump seat, disposed in the axial extension of the pump case, the weight of the said heavy body being at least equal to the greatest of the two forces F_1 and F_2 given by the hereunder expressions:

$$\text{and } F_2 = (2E^2 + R^2)\pi \cdot \Delta P - S_f \Delta P +$$

$$F_1 = \frac{Cf}{\sqrt{4E^2 + R^2}} \times \frac{T}{\sqrt{T^2 + 4\pi^2 (4E^2 + R^2)}}$$

in which expressions:

E is the eccentricity of the rotor (in cm)

R is the radius of the rotor (in cm)

ΔP is the raise of pressure through the pump (in bars)

S_f is the surface area of the transverse section of the sealing device of the pump case (in cm^2)

C_d is the torque exerted on the rotor at the starting of the pump (in cm Kg)

C_f is the torque then the pump is operated continuously (in cm Kg)

T is the pitch length of the stator (in cm).

4,957,162

DEVICE FOR ANCHORING A PROBE IN A WELL BY SPREADING MOBILE ANCHORAGE ARMS

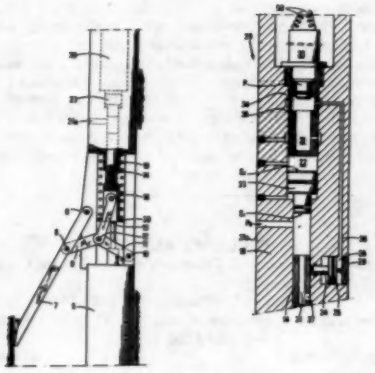
Noël Etourmy, Saint Gaudens, and Jean Laurent, Orgeval, both of France, assignors to Institut Francais du Petrole, Rueil-Malmaison and Ateliers Mecaniques mde Saint Gaudens "A.M.G.", Saint Gaudens, both of, France

Filed May 30, 1989, Ser. No. 357,994

Claims priority, application France, May 30, 1988, 88 07275

Int. Cl.[5] E21B 23/04

U.S. Cl. 166—212 **4 Claims**



2. A anchorage device for anchoring a probe means in a well, the anchorage device comprising at least one anchorage arm adapted to be pivoted with respect to a body of the probe means, at least one spring means, a rod means driven in a translatory movement by expansion of the spring means, means for transforming the translatory movement of the rod means into a pivoting movement of the at least one anchorage arm means, means for intermittently immobilizing the rod means in a compressed position of the spring means comprising a bolt means adapted to be engaged in a radial recess means of the rod means in the compressed position of the spring means, and hydraulic means for moving the bolt means towards a release position when the rod means is released, said hydraulic means comprising a cavity means formed in the body of the probe means, a head means fast with the bolt means in translation and adapted to slide in said cavity means, a section of said head means being greater than a section of the bolt means, and a hydraulic circuit means for applying a variable pressure to the head means of the bolt means, wherein pressure application means are provided for permanently applying to the bolt means a pressure equal to a pressure prevailing in the well and an opposite pressure to the head means which may vary between a first pressure having a value sufficient to move the bolt means toward said engagement position in the radial recess means of the rod means, and a second low pressure so that the bolt means is pushed toward said release position, and wherein the hydraulic circuit means comprises a duct means opening

into the cavity means on a side of the head means opposite to the bolt means, and switching means for selectively applying the first pressure or the second pressure to said head means.

4,957,163

METHOD OF STABILIZING POLYMER SOLUTIONS IN A SUBTERRANEAN FORMATION

Mark B. Ward, Missouri City, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Jan. 8, 1990, Ser. No. 461,942
Int. Cl.[5] E21B *43/22*
U.S. Cl. 166—273 13 Claims

1. A process for recovering petroleum from an underground reservoir having acidic sites wherein the reservoir is penetrated by at least one injection well and at least one production well, said wells being in fluid communication with each other, comprising:

a. injecting through the injection well into the reservoir an effective amount of an aqueous solution of urea to neutralize the acidic sites on rock in the reservoir,

b. injecting into the reservoir an amount of an aqueous solution of a water-soluble polymer as an oil drive fluid,

c. forcing the urea and polymer solutions through the reservoir to drive the petroleum toward the production well, and

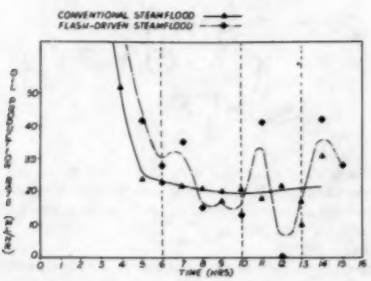
d. recovering petroleum from the reservoir through the production well.

4,957,164

ENHANCED OIL RECOVERY USING FLASH-DRIVEN STEAMFLOODING

Steven D. Roark, Bartlesville, Okla., assignor to IIT Research Institute, Chicago, Ill.

Filed Apr. 17, 1989, Ser. No. 339,148
Int. Cl.[5] E21B *43/24*
U.S. Cl. 166—263 3 Claims



1. In a method for recovery of oil from light oil reserves in a subterranean oil-bearing formation by injecting steam into the formation through an injection well and recovering oil from a production well at a distance from the injection well, the improvement comprising:

(a) injecting steam through an injection well into a light oil-bearing formation while gradually reducing the production rate of oil recovered from a production well located at a distance from said injection well so that the pressure in said formation increases at a predetermined rate of from about 5 to about 50 psia per day from an original value to a predetermined maximum value; (b) maintaining injection of said steam through said injection well after increasing the production rate of oil recovered from said production well to a value such that said predetermined maximum pressure value is maintained for a predetermined time; and (c) gradually increasing the production rate of oil recovered from said production well so that the pressure in said formation decreases at a predetermined rate of from about 5 to about 50 psia per day from said predetermined maximum value back down to said original value.

4,957,165

WELL TREATMENT PROCESS

Lisa A. Cantu, Ponca City, Okla.; Marion W. Osborne, Houston, Tex., and Edward F. McBride, Wilmington, Del., assignors to Conoco Inc., Ponca City, Okla.

Continuation-in-part of Ser. No. 155,786, Feb. 16, 1988, Pat. No. 4,848,467. This application Jun. 19, 1989, Ser. No. 368,689
The portion of the term of this patent subsequent to Jul. 18, 2006, has been disclaimed.
Int. Cl.[5] E21B *33/138, 43/12*
U.S. Cl. 166—295 7 Claims

1. In a process for treating a well in a subterranean formation penetrated by a wellbore wherein a well treatment fluid comprising an aqueous gel is pumped down said wellbore as part of a well treatment procedure, wherein a particulate fluid loss additive is included in said well treatment fluid, and wherein a gel filter cake is formed on the surfaces of said wellbore in said formation, the improvement comprising:

utilizing as at least a part of said fluid loss additive a hydroxyacetic acid condensation product, said condensation product being degradable at formation conditions whereby hydroxyacetic acid monomers and dimers are formed, and said condensation product being present in an amount sufficient to provide enough degradation products including hydroxyacetic acid to react with and break the gel in said filter cake and to recover permeability in said formation without the necessity of adding a separate gel-breaking material after formation of said gel filter cake.

4,957,166

LOST CIRCULATION TREATMENT FOR OIL FIELD DRILLING OPERATIONS

Robert D. Sydansk, Littleton, Colo., assignor to Marath Oil Company, Findlay, Ohio

Continuation-in-part of Ser. No. 380,565, Jul. 14, 1989. This application Oct. 11, 1989, Ser. No. 419,862
Int. Cl.[5] E21B *21/08, 33/138*
U.S. Cl. 166—295 47 Claims

1. A process for preventing significant lost circulation of a drilling fluid across a face in a formation while drilling a wellbore in said formation having a matrix below and earthen surface, the process comprising:

a) suspending drilling of said wellbore;

b) admixing componets of a continuous nonflowing gel at the surface to form a flowing partial gel having an initial pH of about 3 to about 13 and comprising a water-soluble carboxylate-containing polymer, a complex capable of crosslinking said polymer and formed of at least one electropositive chromium III species and at least one electronegative carboxylate species, and an aqueous solvent for said polymer and said complex;

c) injecting said partial gel into said wellbore and placing said partial gel at a face in direct communication with said wellbore;

d) forming said nonflowing gel from said partial gel at said face to prevent significant lost circulation across said face; and

e) resuming of said wellbore.

4,957,167

RETRIEVABLE FLUID CONTROL VALVE WITH DAMPING

Roger L. Schultz, Plano, Tex., assignor to Halliburton Co., Stephens County, Okla.

Filed Apr. 14, 1989, Ser. No. 338,256
Int. Cl.[5] E21B *34/08*
U.S. Cl. 166—319 15 Claims

1. A fluid control valve apparatus for controlling fluid flow through a tubing string of a well, comprising:

a housing including:

sealing means for sealingly engaging said tubing string;

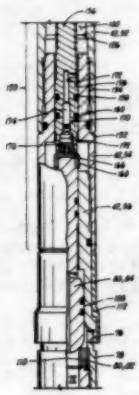
a flow passage defined through said housing and having an open end defined in said housing below said sealing means; and

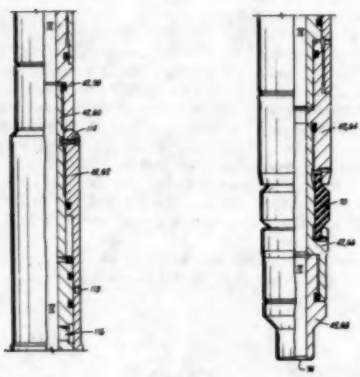
a flow port defined through said housing and communicating said flow passage with an exterior of said housing above said sealing means;

a flow valve means, disposed in said housing, and movable between a closed position wherein said flow passage is closed, and an open position wherein said flow passage is open;

spring biasing means, associated with said flow valve means, for biasing said flow valve means toward its said closed position;

differential area piston means, associated with said flow valve means, for overcoming said spring biasing means and for moving said flow valve means to its said open position when a fluid pressure exterior of said housing at said flow port exceeds a predetermined value; and





damping means, associated with said flow valve means, for substantially overdamping closing movement of said flow valve means from its said open position to its said closed position, and for eliminating the possibility of resonant vibration of said flow valve means regardless of a rate of fluid flow through said flow passage.

4,957,168

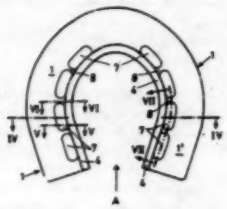
METALLIC-SOUNDING PLASTIC HORSESHOES

Orlando A. Battista, 3863 SW Loop 820, Suite 100, Fort Worth, Tex. 76133-2076

Filed May 3, 1989, Ser. No. 346,719

Int. Cl.[5] A01L *5/00*

U.S. Cl. 168—4 **11 Claims**



8. The method of molding a horseshoe comprising the step of molding a horseshoe from a synthetic polyphenylene sulfide resin.

4,957,169

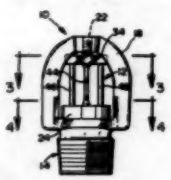
SPRINKLER VALVE ASSEMBLY

George S. Polan, Harleysville, Pa., assignor to Central Sprinkler Corporation, Lansdale, Pa.

Continuation-in-part of Ser. No. 307,557, Feb. 1, 1989, abandoned. This application Feb. 6, 1990, Ser. No. 475,629

Int. Cl.[5] A62C *37/12*

U.S. Cl. 169—37 **13 Claims**



1. A sprinkler including a body having a flow passage for a fire extinguishing fluid and a valve assembly axially loaded by an adjustable screw or the like to seal the flow passage, said valve assembly comprising:

a plate,

a valve plug seated at an outlet end of the flow passage,

a single thermal responsive element and two or more support pins extending between and seated at opposite ends thereof in said plate and valve plug,

said thermal responsive element and support pins being spaced apart so as to reduce the axial load on said thermal responsive element substantially without thermal obtrusion of said thermal responsive element to an air stream by said support pins at substantially all angular orientations of said valve assembly with respect to a central axis of the valve assembly.

4,957,170

CURB AND GUTTER SHOVEL

Larry D. Beard, P.O. Box 160, Clayton, Calif. 94517

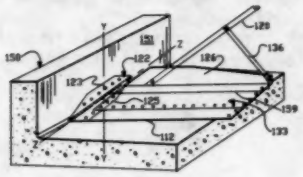
Filed Jul. 28, 1989, Ser. No. 386,309

Int. Cl.[5] A01B *1/00*

U.S. Cl. 172—372 **24 Claims**

1. A shovel for scraping material froma curb and gutter interconnected by a fillet, said curb having a curb face extending from the fillet, said shovel comprising: a shovel blade

having a bottom edge and top edge and first side edge that forms an acute internal angle with the bottom edge and a second side edge that forms an oblique internal angle with the bottom edge, wherein the first side edge has a first wall that extends from the first side edge parallel to the curb face wherein the first wall conforms to the shape of the fillet and the



curb face interconnecting the gutter so that the first wall of the shovel slidablely engages the fillet between the curb and gutter so as to prevent scraped material from flowing between the wall and the curb, a means for preventing material from rolling over the top edge of the shovel, said preventing means connected to the shovel blade, and a handle connected to said blade at an acute internal angle.

4,957,171

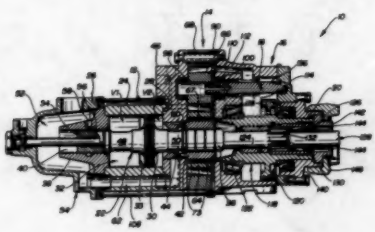
PNEUMATIC DRILL

Ward D. Morrison, and Arthur A. Michaud, both of Claremont, N.H., assignors to Cannon Industries, Inc., Claremont, N.H.

Filed Apr. 24, 1989, Ser. No. 341,777

Int. Cl.[5] B25D *9/18*

U.S. Cl. 173—104 **11 Claims**



1. An improved valveless pneumatic drill having a percussion unit with a cylinder block having a central passage with a piston reciprocating therein between a first and a second distributor, a pneumatic motor, and a main housing containing a chuck drive assembly having a rotating chuck for engaging a striker bar; the improvement comprising:

a reservoir communicating with the first distributor and the second distributor; and

a pneumatic motor gear rotatably mounted around the second distributor, said motor gear being mounted between a first plate and a second plate, wherein the piston of the percussion unit, the air motor gear, and the striker bar are axially aligned.

4,957,172

SURVEYING METHOD FOR LOCATING TARGET SUBTERRANEAN BODIES

Bob J. Patton, Dallas, and C. Mackay Foster, Burleson, both of Tex., assignors to Patton Consulting, Inc., Dallas, Tex.

Filed Mar. 1, 1989, Ser. No. 317,634

Int. Cl.[5] E21B *7/04, 47/022*; G01V *3/08, 3/26*

U.S. Cl. 175—61 **5 Claims**

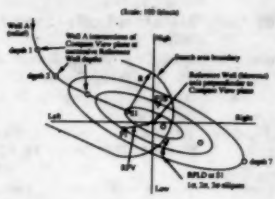
1. A method of drilling a relief well for intersection with a blowout well for the purpose of killing said blowout well, comprising the steps of:

collecting survey data relating to the blowout wellbore surface location and the borehole path of said blowout wellbore;

determining a first set of error coefficients for said survey data for said blowout wellbore;

collecting survey data relating to the surface location of a relief wellbore and the borehole path of said relief wellbore;

determining a second set of error coefficients for said survey data for said relief wellbore;



using said first and second sets of error coefficients to calculate a relative probable location distribution describing the location of said blowout wellbore relative to the location of said relief wellbore at successive depths;

using said relative probable location distribution at said successive depths to calculate an integral probability of find for each said depth, said integral probability of find being the probability of locating said blowout wellbore using a search tool in said relief wellbore; and

drilling said relief wellbore along a path having a maximum integral probability of find, such that said relief wellbore intersects said blowout wellbore.

4,957,173

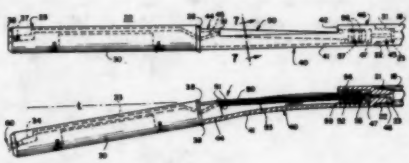
METHOD AND APPARATUS FOR SUBSOIL DRILLING

Frank R. Kinnan, Camas Valley, Oreg., assignor to Underground Technologies, Inc., Byron, Calif.

Filed Jun. 14, 1989, Ser. No. 366,661

Int. Cl.[5] E21B *7/06, 7/18*

U.S. Cl. 175—61 **12 Claims**



11. A method of drilling an underground bore hole comprising the steps of:

(a) providing a nose assembly having a nozzle means to eject a pattern of viscous fluid to disturb and displace subsoil thereby cutting a bore in a first direction;

(b) connecting said nose assembly through a bendable mechanism having a longitudinal axis to a length of trailing drill pipe, said bendable mechanism including a bendable member and a rod having a passage extending therethrough in fluid communication with the drill pipe and the nose assembly, said rod having one end fixedly connected to one end of the bendable member and the other end slidably connected to the other end of the bendable member;

(d) providing said predetermined pressure of said viscous fluid while simultaneously rotating said drill string to effect a cutting action through said subsoil; and

(e) intermittently terminating said rotating action and increasing said predetermined fluid pressure of said viscous

fluid to a second pressure to effect a change in the cutting direction of said nozzle means and said trailing pipe by moving said other end of the rod relative to the bendable member thereby bending said bendable member away from its longitudinal axis and thereafter reducing the pressure of said viscous fluid to said predetermined first pressure whereby said bendable member will relax and return to a position generally parallel to its longitudinal axis and thereafter effecting rotation of said drill pipe with said fluid flow at said first predetermined pressure to continue cutting said bore.

4,957,174

METHOD OF CONTROLLING LOST CIRCULATION IN WELL DRILLING

Donald L. Whitfill, Ponca City, Okla.; Edwin Kubena, Jr., Richmond, Tex.; Terry S. Cantu, Ponca City, Okla., and Matthew C. Sooter, Katy, Tex., assignors to Conoco Inc., Ponca City, Okla.

Filed Jan. 29, 1989, Ser. No. 374,399

Int. Cl.[5] C09K *7/00, 7/02*; E21B *33/138*

U.S. Cl. 175—72 **8 Claims**

1. In a process of drilling a well wherein a drilling fluid is pumped from the surface of the ground through a drill pipe string in said well and back to the surface of the ground via the annulus between said drill pipe string and the borehole wall of said well and wherein lost circulation of said drilling fluid is encountered, the improvement in correcting said lost circulation of said drilling fluid comprising:

(a) adding to said drilling fluid a lost circulation material consisting essentially of petroleum coke, said petroleum coke having from 35 to 80 percent by weight particles between 10 and 60 mesh and being added in an amount effective to correct said lost circulation; and

(b) pumping said drilling fluid containing said lost circulation material into said well to contact said lost circulation zone whereby said zone is sealed from further lost circulation by said lost circulation material.

4,957,175

SOIL DRILLING EQUIPMENT

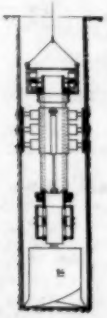
Yitshaq Lipsker, and Boris Prokupetz, both of 24 Trumpeldor Street, 47264 Ramat Hasharon, Israel

Continuation-in-part of Ser. No. 859,493, May 5, 1986, abandoned, and Ser. No. 51,429, May 19, 1987, abandoned. This application Apr. 28, 1989, Ser. No. 344,388

Claims priority, application Israel, May 10, 1985, 75160

Int. Cl.[5] E21B *4/18, 7/02*

U.S. Cl. 175—94 **9 Claims**



5. Apparatus for drilling bore holes, comprising:

first gripping means for holding at least a portion of the apparatus against longitudinal movement in a bore hole, said first gripping means including a pair of gripping members reciprocable transversely with respect to the bore hole;

reciprocable second gripping means for gripping a drilling tool;

means for moving said second gripping means and the gripped drilling tool longitudinally in the bore hole relative to said first gripping means;

drive means for rotating said second gripping means and the gripped drilling tool; and

drive shaft means for connecting said drive means to said second gripping means and the gripped drilling tool.

4,957,176

PROCESS AND APPARATUS FOR DETERMINING THE CONSUMPTION OF A RAW MATERIAL IN A PROCESSING MACHINE

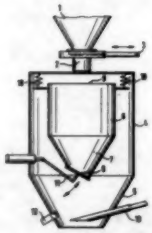
Udo Roth, Ranstadt, Fed. Rep. of Germany, assignor to Colortronic Reinhard GmbH & Co. KG, Friedrichsdorf-Köppern, Fed. Rep. of Germany

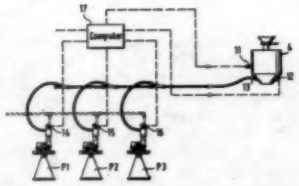
Filed Jul. 10, 1989, Ser. No. 377,703

Claims priority, application Fed. Rep. of Germany, Aug. 17, 1988, 3827927

Int. Cl.[5] G01G *13/16, 13/24*

U.S. Cl. 177—59 **10 Claims**





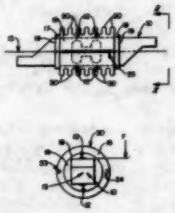
1. A process for determining the consumption of a raw material in a processing machine, especially a plastics processing machine, in which said raw material is stored in a raw material storage container, comprising the steps of withdrawing a portion of the quantity of the raw material stored in said storage container, gravimetrically determining said portion, storing said gravimetrically determined portion in an intermediate storage vessel, connecting a plurality of said processing machines with said intermediate storage vessel, supplying one of said processing machines with said raw material and determining which one of said processing machines is being supplied with said raw material from said intermediate storage vessel.

4,957,177

ENCLOSED MOMENT-INSENSITIVE LOAD CELL

Michael N. Hamilton, Columbus, and Edwin J. Stolz, Westerville, both of Ohio, assignors to Toledo Scale Corporation, Worthington, Ohio

Filed Aug. 9, 1989, Ser. No. 391,461
Int. Cl.[5] G01G 3/14, 21/02; G01L 25/00
U.S. Cl. 177—211 15 Claims



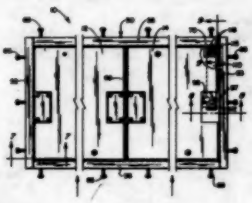
1. A load cell comprising at least one beam having a central longitudinal axis, a force transducer mounted on the beam, enclosure means enclosing the portion of said beam bearing the force transducer, said enclosure means having a first end and a second end rigidly attached to said beam, said enclosure means including at least one convolution to render it flexible to loads applied along said longitudinal axis and means rigid relative to said convolution for reducing non-linear torsional deformation of said enclosure means under loads applied transversely to said longitudinal axis.

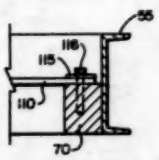
4,957,178

WEIGH-IN-MOTION SCALE

Nigel G. Mills, Worthington, Ohio, assignor to Toledo Scale Corporation, Worthington, Ohio

Filed Aug. 22, 1989, Ser. No. 397,108
Int. Cl.[5] G01G 19/02, 21/24
U.S. Cl. 177—134 12 Claims





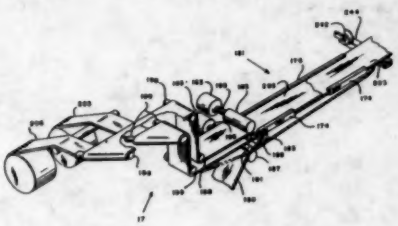
1. Apparatus for weighing vehicles in motion comprising a base for anchoring to a roadbed in the path of moving vehicles, a weighing platform mounted on said base for receiving the wheels of moving vehicles, load cell means between the base and the platform for providing signals indicating the loads applied by the wheels on the platform, and means connected between the platform and the base to apply a vertical preload and to resist relative horizontal movement between the base and the platform.

4,957,179

TAPE MODULE FOR A MODULAR MAILING MACHINE

Hugh S. Dannatt, Bethel, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Division of Ser. No. 134,626, Dec. 17, 1987, Pat. No. 4,852,786.
This application Dec. 19, 1988, Ser. No. 286,119
Int. Cl.[5] B41J 3/00; G01G 19/40
U.S. Cl. 177—145 4 Claims



1. A mailing machine comprised of a plurality of modules, each of said modules mounted in said mailing machine to form a single process station, said mailing machine having a base and a plurality of support walls, wherein said modules comprise:

a scale module having means for weighing an envelope, means including a weighing plate with a recess formed therein;

a transport module having means for positioning said envelope in said process station and ejecting said envelope from said process station;

a meter module having a registration area and a printing means located in said registration area for imprinting an indicia on said envelope, said registration area being vertically aligned to and spaced above said recess in said weighing plate;

a platen module having a platen plate and an elastomeric member fixably mounted to a first surface of said platen plate;

platen support means for supporting said platen plate such that said elastomeric member is opposite said registration area of said meter module and for selectively positioning said platen module in a first position wherein said elastomeric member is in close proximity to said printing means of said meter module and a second position wherein said elastomeric member is positioned generally below said weigh plate of said scale module, and

a tape module, including,

a tape track,

means for supporting said tape track in a generally cantilevered manner;

tape positioning means for selectively positioning said tape track supporting means in a first position, between said meter module and said platen module and in second position laterally removed from said first position and below said meter module;

tape feed means for selectively feeding a tape to and through said tape track such that said fed tape resides within said tape track when said tape track is in said first position;

said mailing machine having a support surface; and said tape positioning means comprising:

a rail track fixably mounted to said support surface;

a rail mounted for sliding motion along said rail track; said tape track supporting means being fixably mounted to said rail;

a bracket fixably mounted to said tape track supporting means, said bracket having an elongated slot formed therein;

a crank rotatably mounted to said support surface and having a pin slidably mounted in said slot of said bracket such that rotation of said crank causes said rail to displace along said rail track; and

drive means for rotatably displacing said crank.

4,957,180

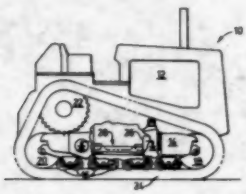
GUARD ASSEMBLY FOR A VEHICLE

Bryan G. Lammers, Washington, and Kenneth V. Blaha, East Peoria, both of Ill., assignors to Caterpillar Inc., Peoria, Ill.

Filed Jul. 14, 1989, Ser. No. 379,767

Int. Cl.[5] B62D *25/20*

U.S. Cl. 180—69.1 **10 Claims**



1. A guard assembly for a vehicle having a frame having first and second sidewalls and first and second endwalls, said sidewalls and endwalls each having an inner surface and defining a first space therebetween, said guard assembly comprising:

a plurality of stop blocks, each block being connected to a respective inner surface of one of said sidewalls and said endwalls at a preselected first elevational position;

a plurality of retaining brackets, each bracket being in contact with and connectable to one of the inner surfaces of said sidewalls and said endwalls at a preselected second elevational position, said second position being elevationally lower than said first position, each of said stop blocks and each of said retaining brackets defining a second space therebetween; and

a guard plate having first and second side portions, first and second end portions, and a central body portions, said guard plate adapted to be positioned completely within said first space and maintained substantially in said position by said stop blocks and said retaining brackets, said guard plate being moveable within said first and second spaces and within predetermined limits in longitudinal and lateral directions.

4,957,181

ELECTRIC POWER STEERING SYSTEM

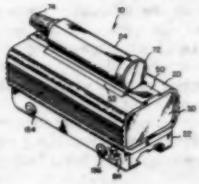
Saiichiro Oshita, and Toyohiko Mouri, both of Ohta, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 198,393, May 24, 1988, abandoned. This application Dec. 8, 1989, Ser. No. 449,131

Claims priority, application Japan, May 25, 1987, 62-127427

Int. Cl.[5] B62D *5/04*

U.S. Cl. 180—79.1 **8 Claims**



1. In an electric power steering system having a motor operatively connected to a steering system for reducing steering effort, a vehicle speed sensor for producing a vehicle speed signal representing vehicle speed, a torsion torque sensor provided for detecting torsion torque generated in the steering system in a steering operation, assist means responsive to an output signal of the torsion torque sensor for producing an assist signal, a steering angle sensor provided for detecting steering angle of a steering wheel for producing a steering angle signal representing the steering angle, return torque means responsive to said steering angle signal for producing a return torque signal for returning said steering wheel, the improvement comprising:

angular velocity calculator means for differentiating the steering angle signal and for producing an angular velocity signal representing angular velocity of the steering wheel;

damping means responsive to said angular velocity signal for producing a damping signal having a reverse polarity to rotational direction of the steering wheel;

storing means for storing a plurality of coefficients which increase in value with increasing vehicle speed;

said storing means being responsive to said vehicle speed signal for deriving from said storing means the coefficient corresponding to the vehicle speed represented by said vehicle speed signal;

multiplying means for multiplying said damping signal by the derived coefficient and for producing a corrected damping signal;

summing means for summing said assist signal, said return torque signal and said corrected damping signal for producing a total signal;

driving means responsive to said total signal for driving the motor, whereby the steering wheel is returned by the total signal of said return torque signal and said corrected damping signal, the latter increasing in value with increase of the vehicle speed, when said assist signal disappears upon as driver releasing the steering wheel.

4,957,182

ELECTRIC POWER STEERING APPARATUS

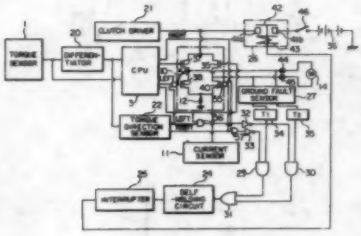
Mitsuharu Morishita; Kosaku Uota, and Takeshi Yasukawa, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 28, 1989, Ser. No. 344,579

Claims priority, application Japan, Apr. 28, 1988, 63-108132

Int. Cl.[5] B62D *5/04*

U.S. Cl. 180—79.1 **2 Claims**



1. An electric power steering apparatus for a vehicle comprising:

an electric motor which can be connected to a steering gear of a vehicle so as to steer the vehicle;

a steering torque sensor for sensing the steering torque applied to a steering shaft by a driver of the vehicle and generating a corresponding output signal;

control means for determining the proper rotational direction of said motor based on the output signal of said torque

sensor and generating a drive direction signal indicating the direction in which said motor should rotate;

a torque direction sensor which senses the direction of the torque applied to the steering shaft by the driver based on the output signal of said steering torque sensor and generates a torque direction signal indicating the direction of the applied torque;

a motor driver which is responsive to said control means and drives said motor in the direction indicated by the drive direction signal;

a ground fault sensor which senses a ground fault in said motor driver and generates a corresponding output signal;

disagreement sensing means for sensing when the direction indicated by the torque direction signal from said torque direction sensor does not agree with the direction indicated by the drive direction signal from said control means; and

interrupter means for preventing current from being supplied to said motor driver when said ground fault sensor generates an output signal indicating a ground fault of said motor driver and said disagreement sensing means senses a disagreement of the torque direction signal and the drive direction signal.

4,957,183

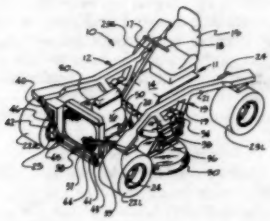
4-WHEEL COORDINATED STEERING MULTI-PURPOSE TRACTOR

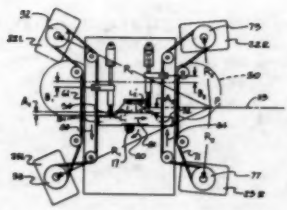
Paul W. Mullett, Hesston, and Elmer D. Voth, Newton, both of Kans., assignors to Excel Industries, Inc., Hesston, Kans.

Filed Jun. 1, 1989, Ser. No. 360,118

Int. Cl.[5] A01D *35/26*; B60G *11/08*; B62D *5/06, 7/16*

U.S. Cl. 180—234 **13 Claims**





1. Apparatus for controlling the longitudinal direction of movement of a motorized vehicle comprising:

(a) a frame means having a central frame and first and second side frames;

(b) first and second pairs of wheels;

(c) journal means mounting each of said wheels to said side frames and the side frames to the central frame for rotation of the side frames about a first axis parallel to a plane through said frame means; and the wheels about a second axis perpendicular to said plane;

(d) first and second turning means coupled to said second axis of the journal means for rotating said first pair of wheels in opposite directions from each other, and said second pair of wheels in opposite directions from each other, respectively;

(e) first and second cam means having first and second cam follower means resepectively;

(f) steering means rotatably attached to said frame means and communicating with said cam means; and,

(g) means for coupling said first and second cam follower means to said first and second turning means, respectively, said cam means being configured in a manner to cause said first and second pairs of wheels to follow a first and second circumference, both having a common center, when said steering wheel is turned, said common center lies upon a transverse line passing approximately through the center of the vehicle.

4,957,184

LOUDSPEAKER ENCLOSURE

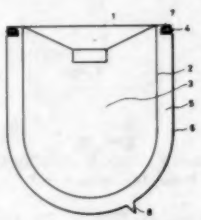
Hirokazu Negishi, Surrey, England, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 17, 1989, Ser. No. 311,861

Claims priority, application United Kingdom, Feb. 24, 1988, 8804232

Int. Cl.[5] H05K *5/00*

U.S. Cl. 181—153 **10 Claims**



1. A loudspeaker enclosure, comprising:

an inner wall member;

an outer wall member spaced from said inner wall member and defining a volume space therebetween, said inner and outer wall members being sealed and the volume space evacuated of air to define a vacuum space therebetween, and said inner and outer wall members defining an opening in which a loudspeaker can be arranged.

4,957,185

ROOF SCAFFOLD

Claude J. F. Courchesne, 19 Bluebell Crescent, Ancaster, Ontario, Canada L9K 1G2, and Theodore R. Palmer, 309 Orkney Street West c/o General Delivery, Caledonia, Ontario, Canada N0A 1A0

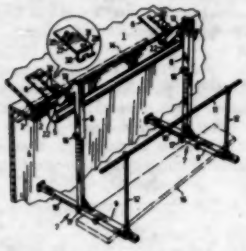
Filed Feb. 12, 1990, Ser. No. 479,051

Int. Cl.[5] E04G *3/12*

U.S. Cl. 182—150 **10 Claims**

1. A scaffold support comprising a roof cleat and a bracket supported therefrom; said roof cleat comprising a flat apertured metal fastening plate connected by a hinge to a hooked end plate; said bracket comprising a vertical member having an upper end and a lower end when arranged in its operative position, said upper end joined to a downwardly projecting angle member which terminates in a pin mounted transverse to the longitudinal axis of said angle member, said lower end of said vertical member being joined to a horizontal member in the same plane as said angle member but at 180° thereto, an extension leg slidably mounted with respect to said horizontal member parallel thereto and projecting in the same direction as said angle member, means to adjustably longitudinally locate said leg with respect to said horizontal member; means to

fasten said roof cleat to the edge of the roof of a building having a wall and roof supported thereon with said hinge on the edge of said roof and the hooked end plate hanging down



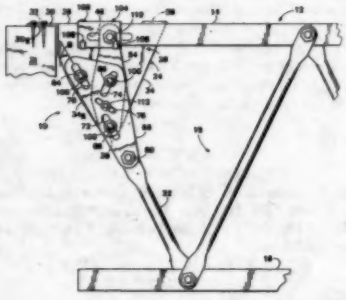
vertically, whereby when said pin is hooked in the booked end plate and said leg is adjusted to its proper length and bearing against the wall of said building, the vertical member of said bracket is maintained in its vertical position.

4,957,186

SPAN-ADJUSTABLE OPEN-WEB SUPPORT BRACKET

William R. Reetz, Boise, Id., assignor to T J International, Inc., Boise, Id.

Filed Dec. 11, 1989, Ser. No. 448,323
Int. Cl.[5] E04H *12/18*; E04C *3/292*
U.S. Cl. 248—296 **20 Claims**



1. A span-adjustable open-web support bracket for use in a truss having an upper chord member with a slot in an end thereof, a lower chord member, and a plurality of spaced web members interconnecting the chord members, the bracket comprising:

a chord-length adjustment mechanism attached adjacent the end of the upper chord for adjusting the length of the upper chord;

a web-member length adjustment mechanism attached to a web member adjacent the chord-length adjustment-mechanism; and

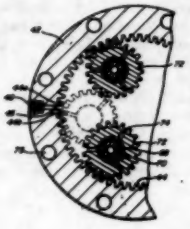
an interlock located between the mechanisms for coordinating chord length and web-member length adjustments.

4,957,187

GEAR-DRIVEN LUBRICANT CIRCULATION SYSTEM

Harry L. Burgess, Houston, Tex., assignor to Burgess & Associates Mfg., Inc., Houston, Tex.

Continuation of Ser. No. 232,318, May 15, 1988, Pat. No. 4,872,530. This application Jul. 28, 1989, Ser. No. 386,999
The portion of the term of this patent subsequent to Oct. 10, 2006, has been disclaimed.
Int. Cl.[5] F01M *5/00*
U.S. Cl. 184—6.12 **12 Claims**



2. In the combination of a gear box having an inner chamber containing a drive gear operatively connected and meshed with a driven gear, the improvement which comprises:

a. a gear box having an inner chamber having a toothed inner chamber surface segment meshing with one of said gears,

b. said gear box having a lubricant inlet port and a lubricant outlet port formed therein, each of said ports extending from the outside of said gear box to the hollow chamber in said gear box, said outlet port terminating at the surface of said inner chamber in a groove between two adjacent teeth of said toothed inner chamber surface segment,

c. a lubricant outlet line interconnected with said outlet gear box port, and

d. a lubricant inlet line interconnected with said inlet gear box port,

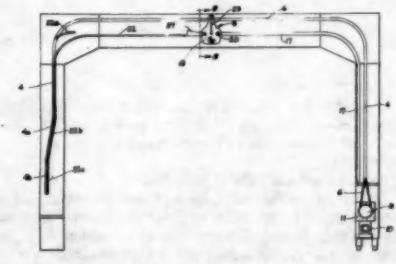
e. whereby, movement of said teeth of said one of said gears past said groove between said two adjacent teeth will force a pulse of lubricant from the groove between said two adjacent teeth through said outlet port and said gear box outlet line.

4,957,188

CONVEYOR SYSTEM WITH STABILIZED CONVEYOR BASKET

Edward F. Bavis, 201 Grandin Rd., Maineville, Ohio 45039

Filed Sep. 27, 1988, Ser. No. 249,704
Int. Cl.[5] E04H *3/04*
U.S. Cl. 186—41 **15 Claims**



12. In a conveyor system wherein a carrier basket is con-

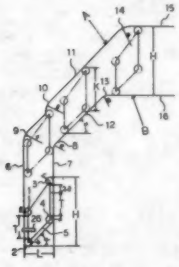
veyed between first and second stations by a spaced apart pair of drive members, a carrier basket having opposing end walls, mating elongated vertical slots in said opposing end walls, a said carrier rod extending through said slots, whereby said carrier basket may be suspended between the drive member by securing the opposite ends of said carrier rod to the guide members and said carrier basket may be displaced relative to said carrier rod, and stabilizing means to prevent rocking movement of the carrier basket as it is conveyed by the drive members, said stabilizing means comprising cam tracks positioned to follow the paths of travel of the drive members, and having cam track follower means mounted on said carrier basket engagable with said cam tracks.

4,957,189

LIFTING DEVICE

Kenjiro Tanaka, 12-30 Chuo 3-chome, Kofu-shi, Yamanashi-ken, Japan

Filed Aug. 18, 1989, Ser. No. 396,083
Claims priority, application Japan, Feb. 18, 1988, 63-35567
Int. Cl.[5] B66B 9/06
U.S. Cl. 187—12 **14 Claims**



1. A lifting device comprising:

an outer rail composed of an outer vertical section, an outer inclined section, and an outer horizontal section, said outer vertical and inclined sections made integral via a first outer curve section and a second outer curve section, and said outer inclined and horizontal sections made integral via a third outer curve section;

an inner rail composed of an inner vertical section, an inner inclined section, and an inner horizontal section, said inner vertical and inclined sections made integral via a first inner curve section, and said inner inclined and horizontal sections made integral via a second inner curve section; and

a carrier having an upper front roller, a lower front roller, an upper rear roller, and a lower rear roller, said carrier movably fitted between said outer and inner rails.

4,957,190

APPARATUS FOR CONVEYING REFUSE CONTAINERS

Tomoya Tokuhiro; Teruhiko Miyauchi; Koshin Kikuchi, and Teruhiko Momoi, all of Tokyo, Japan, assignors to Shimizu Construction Co., Ltd., Tokyo, Japan

Filed Feb. 28, 1989, Ser. No. 316,938
Int. Cl.[5] B66B 9/00
U.S. Cl. 187—32 **3 Claims**

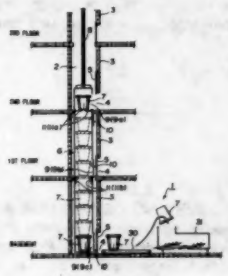
1. An apparatus for conveying refuse containers in a structure, the apparatus comprising:

a plurality of refuse containers;

a generally vertical shaft passing through a plurality of floors in the structure;

a longitudinally elongated cab positioned in said shaft, said elongated cab having a height which extends over at least two of the plurality of floors in the structure, the elongated cab containing said plurality of refuse containers in such a manner that the refuse containers are vertically aligned, and having a plurality of lateral windows as portals at least at the top and bottom of the elongated cab for the refuse containers;

first lifting means installed in the shaft for moving said elongated cab up and down in a generally vertical line throughout said shaft; and



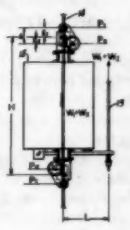
second lifting means disposed in the elongated cab for moving said refuse containers up and down in a generally vertical line throughout the elongated cab, the second lifting means comprising an elongated guide means generally vertically extending through substantially the entire height of the cab, and holding means for holding the refuse container, the holding means being movable upward and downward with respect to said guide means.

4,957,191

GUIDE DEVICE FOR HYDRAULIC ELEVATOR

Yoshinori Nakanishi, Chiba, Japan, assignor to Otis Elevator Company, Farmington, Conn.

Filed Jun. 6, 1989, Ser. No. 362,191
Claims priority, application Japan, Jun. 9, 1988, 63-142385
Int. Cl.[5] B66B 7/02
U.S. Cl. 187—95 **2 Claims**



1. A guide assembly for a cantilevered hydraulic elevator for guiding movement of the elevator cab along guide rails in the elevator hoistway, said assembly comprising:

a. a first guide sub-assembly mounted above the cab, said first sub-assembly comprising a first stand fixed with respect to the cab; a first arm mounted on said stand, said first arm being pivotable about an axis which coincides with a vertical plane of symmetry of the guide rails; a first guide shoe mounted on one pivoting end of said first arm, said first guide shoe embracing the blade portion of said guide rail; and a first guide roller mounted on an opposite pivoting end of said first arm, said first guide roller engaging one side surface of the guide rail blade; and

b. a second guide sub-assembly mounted below the cab, said

second sub-assembly comprising a second stand fixed with respect to the cab; a second arm mounted on said stand, said second arm being pivotable about an axis which coincides with said vertical plane of symmetry of the guide rails; a second guide shoe mounted on one pivoting end of said second arm, said second guide shoe embracing the blade portion of said guide rail; and a second guide roller mounted on an opposite pivoting end of said second arm, said second guide roller engaging the side surface of the guide rail blade opposite to said one side surface thereof.

4,957,192

AUTOMATIC ADJUSTING DEVICE FOR A DISC BRAKE

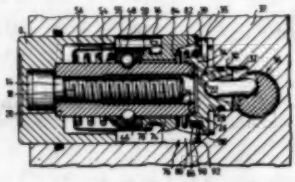
Rolf Weiler, Frankfurt am Main; Claus-Peter Panek, Steinbach, and Bodo Schmidt, Lauterbach, all of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 154,773, Feb. 10, 1988, abandoned. This application Apr. 6, 1989, Ser. No. 334,740

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1987, 3705041

Int. Cl.[5] F16D *55/224, 65/56*

U.S. Cl. 188—71.9 **7 Claims**



1. An automatic adjusting device for a disc brake, with the disc brake comprising a brake piston which, for the application of a brake shoe, is displaceably arranged in a brake cylinder and which is actuatable by means of a hydraulic and a mechanical actuating device;

said adjusting device further comprising an extensible adjusting member arranged between the brake piston and the mechanical actuating device and including two adjusting elements interconnected by way of a thread in non-self-locking engagement; and

said adjusting device further comprising a friction clutch having conical friction surfaces for fixing the position of one of the adjusting elements upon mechanical actuation, with one of the conical friction surfaces being provided on one of the adjusting elements, while the other friction surface is provided on a mechanically actuatable clamping member, and said adjusting device further comprising a bowl-type spring retainer for a first spring, said retainer secured to the brake housing by virtue of an accommodation sleeve, said accommodation sleeve being seated in a portion of a bore of the brake housing between said retainer and said clamping member, a second spring mounted between said portion of said bore and said clamping member and engaging said accommodation sleeve and said clamping member, wherin said accommodation sleeve is comprised of separate finger-like projections having radially extending surfaces continuing into a conical surface facing the mechanical actuating device, said finger-like projections being resilient in the radial direction for press-fitted securement.

4,957,193

ACTUATING CYLINDER HAVING MECHANICAL ADVANTAGE

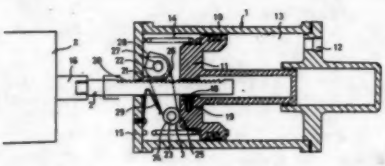
Hideo Tamamori, Kobe, Japan, assignor to Nippon Air Brake Company, Kobe, Japan

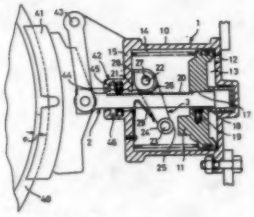
Filed Aug. 14, 1989, Ser. No. 393,166

Claims priority, application Japan, Aug. 22, 1988, 63-208616

Int. Cl.[5] F01B *9/00;* **B60T** *11/10*

U.S. Cl. 188—153 R **20 Claims**





1. A fluid pressure actuating cylinder comprising:

(a) a piston member housed in the body of said cylinder and movable from a retracted position to an operative position in response to the supply of fluid pressure thereto to provide an input force;

(b) a push rod having one end projecting through one end wall of said cylinder body for axial movement with said piston member, said one end including an output member;

(c) means for frictionally connecting said push rod to said piston member until such time as said push rod encounters a resistance force greater than the force exerted by said friction connecting means;

(d) a force lever angularly disposed relative to said push rod and engageable therewith at a point intermediate the ends thereof;

(e) a fulcrum pin on which said force lever is rotatably mounted at its one end, the other end of said force lever being engageable with said piston member to transmit said input force from said piston member to said push rod via said force lever in the absence of said frictional connection between said piston member and said push rod.

4,957,194

TORQUE CONVERTER SLIP CONTROL DEVICE

Kenji Sawa; Susumu Kuromida, and Keiji Bota, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Sep. 8, 1988, Ser. No. 242,282

Claims priority, application Japan, Sep. 8, 1987, 62-224728; Oct. 27, 1987, 62-269210

Int. Cl.[5] F16H *45/02;* **B60K** *41/02*

U.S. Cl. 192—0.096 **11 Claims**

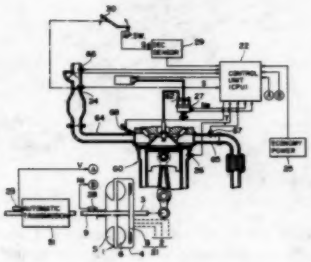
1. A control device for an automatic transmission of an internal combustion engine of a vehicle which has a torque converter, a lockup clutch and slip varying means for varying a fluid coupling efficiency of said lockup clutch so as to control

slippage allowed by the torque converter, and a fuel injection system for delivering a required quantity of fuel into said internal combustion engine, said control device comprising:

deceleration detecting means for detecting a decelerating state of said vehicle;

fuel injection cut-off means for cutting off an injection of fuel by said fuel injection system when said internal combustion engine is at rotational speeds lower than a predetermined fuel injection cut-off speed while said deceleration detecting means detects said vehicle in said decelerating state;

feed-forward slip control means for controlling said slip varying means in feed-forward control to vary said fluid coupling efficiency of said lockup clutch so as to cause said torque converter to allow slippage at a rate suitable



for cancelling a fluctuation of engine torque when said internal combustion engine is at rotational speeds higher than a preselected rotational speed higher than a predetermined fuel injection recovery speed at which an injection of fuel by said fuel system is recovered while said deceleration detecting means detects said vehicle in said decelerating state; and

feed-back slip control means for controlling said slip varying means in feed-back control to vary said fluid coupling efficiency of said lockup clutch so as to make a difference of rotational speed between input and output shafts of said torque converter suitable for canceling a fluctuation of engine torque when said internal combustion engine is at rotational speeds lower than said preselected rotational speed while said deceleration detecting means detects said vehicle in said deceleration state.

4,957,195

HYDRAULIC DEVICE FOR AN AUTOMATIC TRANSMISSION

Takenori Kano, Anjo; Haruki Takemoto, Chiryu; Mamoru Niimi, Handa; Isao Takase, Aichi, and Fumitomo Yokoyama, Anjo, all of Japan, assignors to Aisin AW Co., Ltd., Aichi, Japan

Filed Jan. 4, 1989, Ser. No. 293,394
Claims priority, application Japan, Sep. 27, 1988, 63-242878
Int. Cl.[5] F16D *25/10*
U.S. Cl. 192—106 F **7 Claims**

1. A hydraulic device for an automatic transmission having first, second and third rotating members, forward first speed to direct transmission stages and a reverse transmission stage comprising:

a clutch drum coaxially situated with respect to the first rotating member and having an inner surface,

a first piston member situated inside the clutch drum and having an inner surface,

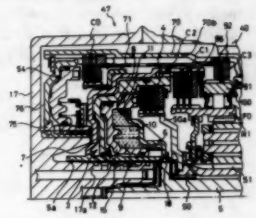
a first hydraulic actuator formed between the inner surface of the clutch drum and the first piston member,

a second piston member situated inside the first piston member,

a second hydraulic actuator formed between the inner surface of the first piston member and the second piston member,

a first clutch connected to the clutch drum, said first clutch engaging between the first rotating member and the second rotating member by means of the first hydraulic actuator while the automatic transmission is in the forward first speed to direct transmission stages,

a second clutch connected to the first piston member, said second clutch engaging between the first rotating member and the third rotating member by means of the second hydraulic actuator while the automatic transmission is in the reverse transmission stage and the first clutch is in disengaging condition,



one centrifugal hydraulic pressure cancel plate situated adjacent to the second hydraulic actuator, said cancel plate having an inner periphery attached to the first rotating member without axial movement thereto and an outer periphery slidably and sealingly situated inside the second piston,

one centrifugal hydraulic pressure cancel chamber defined by the second piston member and the cancel plate, and

a spring situated between the second piston member and the cancel plate, oil in the centrifugal hydraulic pressure cancel chamber and the spring operating against the first and second piston members to remove oil therefrom when the rotating members rotate at high speed.

4,957,196

COIN-OPERATED LOCKER

Kenji Shiojima, and Yuji Kasai, both of Tokyo, Japan, assignors to Kokusan Kinzoku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 19, 1988, Ser. No. 285,935
Claims priority, application Japan, Dec. 28, 1987, 62-330026
Int. Cl.[5] *G07F 17/12*
U.S. Cl. 194—239 **7 Claims**

1. A coin-operated locking system for use in connection with the locking and unlocking of a closure movable mounted upon a support frame, comprising:

first locking means movable between first locked and second unlocked position for locking and unlocking, respectively, said closure relative to said support frame;

detector means for detecting said first locked and second unlocked positions of said first locking means, and for

generating a first signal in response to detection of said first locking means disposed at said second unlocked position;

second locking means movable between first locked and second unlocked positions for locking and unlocking, respectively, said closure relative to said support frame;

sensor means for sensing the deposition of a predetermined amount of coins within said locking system and for generating a second signal in response to said sensing of said deposition of said coins within said locking system for moving said second locking means to said second unlocked position; and

timer means, responsive to said first signal of said detector means, for generating a third signal for moving said second locking means to said first locked position at a predetermined time after receiving said first signal from said detector means indicating that said first locking means is disposed at said second unlocked position.

4,957,197

MACHINE FOR ARRANGING ARTICLES, SUCH AS CANS OF FOOD

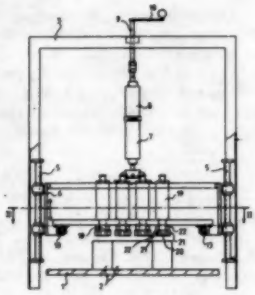
Jean Delapierre, 38, rue d'Orival, 14000 Lisieux, France

Filed Jan. 5, 1989, Ser. No. 293,885

Claims priority, application France, Jan. 5, 1988, 88 00030

Int. Cl.[5] B65G *47/24*

U.S. Cl. 198—394 **7 Claims**



1. A machine for the orientation of articles, such as cans of food, having a moving endless belt on which the articles to be combined are disposed, such as by means of heat-shrink film, the machine comprising: a carriage movable in a reciprocating movement parallel to the direction of movement of the moving endless belt, a support means disposed on the carriage, a series of drive means disposed on the support means, each said drive means adapted to engage and rotate an article, a series of detectors each disposed on the support means near the position of one article on the endless belt, each detector having a corresponding drive means operatively associated therewith, each detector being responsive to a reference on the article, each detector and corresponding drive means adapted to control the angular positioning of the reference on the article to arrange and orientate the article by rotation thereof, the support means having two parts, each part movable parallel to the direction of motion of the moving endless belt to clamp the articles laterally within the drive means for rotation thereof, the carriage including means for moving the drive means in a direction perpendicular to the belt.

4,957,198

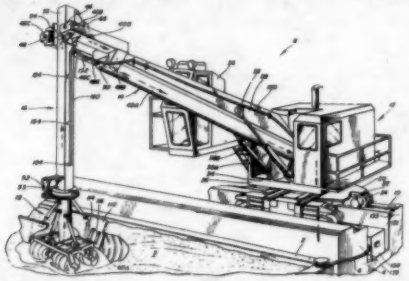
APPARATUS AND METHOD FOR UNLOADING BULK MATERIALS

David J. Miller; Allen R. Miller, and Charles P. Miller, all of McHenry, Ill., assignors to Miller Formless Co., Inc., McHenry, Ill.

Division of Ser. No. 848,907, Apr. 4, 1986, Pat. No. 4,738,350, which is a continuation of Ser. No. 672,151, Nov. 16, 1984, abandoned, which is a continuation of Ser. No. 414,383, Sep. 2, 1982, abandoned. This application Jan. 15, 1988, Ser. No. 144,428

Int. Cl.[5] B65G *65/22*

U.S. Cl. 198—513 **25 Claims**



1. Apparatus for collecting bulk materials and feeding them into a conveyor comprising a conveyor section including an auger having an exposed end portion, a pair of augers disposed with one on each side of said exposed end portion with their axes of rotation in a fixed relation to one another and generally normal to the axis of rotation of said exposed end portion for collecting said bulk material and loading it into said conveyor section, said pair of augers being mounted for joint pivoting adjustment about an axis perpendicular to the longitudinal axis of said exposed end portion, and means for controlled pivotal adjustment of said pair of augers relative to said conveyor section.

4,957,199

CONVEYOR BELT

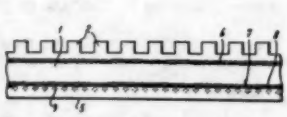
Eduard A. Wokke, Fluessen 7, 9204 HR Drachten, and Hans De Vries, Dollard 292, 9204 CZ Drachten, Netherlands

Continuation of Ser. No. 121,876, Nov. 17, 1987, abandoned. This application Apr. 14, 1989, Ser. No. 338,563

Claims priority, application Netherlands, Nov. 21, 1986, 8602967

Int. Cl.[5] B65G *15/34*

U.S. Cl. 198—847 **1 Claim**



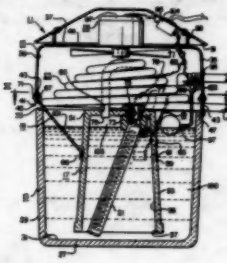
1. A conveyor belt having a ribbed upper carrying surface and an opposite lower surface and having two layers which are rigid in respect of deflection in the transverse direction as well as only one other layer providing longitudinal strength, said layers imparting transverse rigidity being spaced apart and disposed respectively adjacent said upper and lower surfaces, the lower of said layers imparting transverse rigidity being combined with said only one layer imparting longitudinal strength to form one layer consisting of longitudinal and transverse wires, at least said transverse wires being made of high modulus material.

4,957,200

WATER DISTILLATION APPARATUS

William F. Turner, Rte. 2, Box 205-T, Stephenville, Tex. 76401, and James K. Dews, Star Route, Box 80B, Mineral Wells, Tex. 76067

Filed Dec. 28, 1989, Ser. No. 458,330
Int. Cl.[5] B01D 3/02; C02F 1/04
U.S. Cl. 202—181 31 Claims



1. A distillation apparatus, comprising:

(a) a first chamber means having bottom and side walls surrounding a first interior cavity, said first chamber means having an upper opening communicating with said first interior cavity, said first chamber means being adapted to hold a liquid;

(b) second chamber means having top and side walls surrounding a second interior cavity, said second chamber means having a lower opening communicating with said second interior cavity, said second chamber means being located within said first chamber means first interior cavity such that said second chamber means lower opening is in proximity to said first chamber means bottom wall;

(c) heating means for heating liquid in said distillation apparatus, said heating means being coupled to said second chamber means so as to be located inside said second interior cavity;

(d) means defining passages for air flow in and out of said apparatus;

(e) support means for supporting said second chamber means in said first chamber means first interior cavity such that there is no penetration of said first interior cavity below a water line when said first chamber means is filled with liquid, said support means having passages for air flow so as to allow said liquid to degassify before distillation;

(f) condenser means located above said second chamber means, said condenser means having an inlet which communicates with the second interior cavity for receiving vapor from said liquid, and an outlet which exits said apparatus, said condenser means being supported by said support means.

31. A distillation apparatus, comprising:

(a) a first chamber means having bottom and side walls surrounding a first interior cavity, said first chamber means having an upper opening communicating with said first interior cavity, said first chamber means being adapted to hold a liquid, said first chamber means comprising a bowl made of ceramic material;

(b) a cover having top and side walls forming an inverted bowl;

(c) second chamber means comprising an inverted cup so as to have top and side walls surrounding a second interior cavity, said cup bottom being open to allow communication between said first interior cavity and said second interior cavity, said cup being located in said first interior cavity such that said cup bottom opening is in proximity with said first chamber means bottom wall and said cup top wall is located above said cup bottom opening;

(d) heating means for heating liquid in said first chamber means, said heating means being located inside of said second interior cavity, said heating means being mounted to said cup so as to be immersed in said liquid in said second chamber means, said heating means continuously heating said liquid for as long as the level of said liquid is maintained within a predetermined range in said first chamber means;

(e) support means for supporting said cover and said second chamber means, said second chamber means being supported in said first chamber means first interior cavity such that there is no penetration of said first interior cavity below a water line of said first chamber means, said cover being supported above said first chamber means such that there is a gap between said first chamber means and said cover, said cover comprising openings in its top wall to provide for air circulation within said apparatus, said support means comprising plural arms with each arm having inner and outer ends, said outer ends being coupled to said cover, said inner ends being coupled to said second chamber means;

(f) said cup being frustum shaped with the cup bottom opening being larger than the cup top wall, said cup being made of a ceramic material, said cup side wall having an opening allowing communication between said first interior cavity and said second interior cavity, said opening being located between said cup bottom opening and said top wall such that said opening is below the liquid level of said first chamber means;

(g) condenser means located above said second chamber means, said condenser means having an inlet which communicates with the second interior cavity for receiving vapor from said liquid, and an outlet which exits said apparatus, said condenser means being supported by said support means;

(h) fan means for circulating air through said apparatus, said fan means located above said condenser means;

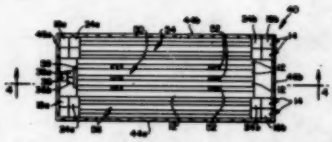
(i) inlet means for providing undistilled liquid to said first chamber means, said inlet means being located above said first chamber means, and valve means for automatically shutting off the flow of liquid into said first chamber means when said liquid in said first chamber means reaches a predetermined level.

4,957,201

SHIPPING CARTON AND FOLDING TABLES

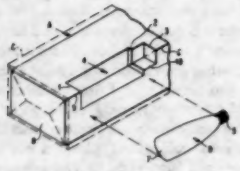
Clifford E. Wieting, P.O. Box 32480, Louisville, Ky. 40232

Filed Feb. 12, 1990, Ser. No. 478,533
Int. Cl.[5] B65D 85/00
U.S. Cl. 206—326 11 Claims



1. In a shipping carton including a plurality of folding tables therein, the folding tables having table tops and foldable leg support means, the table tops having a length greater than their width, each leg support means including two pairs of pivotally connected legs, the improvement comprising table tops detached from said leg support means, said table tops being oriented with their length dimension vertically disposed in the carton and sandwiched between at least two folded leg support means, the length dimension of said table tops being in parallel with said pair of legs.

4,957,202
COMMODITY PACKAGE WITH AUXILIARY CONTAINER PORTION
Kanetsugu Yoshiki, and Takanaga Urayama, both of Osaka, Japan, assignors to Sunstar Kabushiki Kaisha, Osaka, Japan
Filed Aug. 21, 1989, Ser. No. 396,199
Int. Cl.[5] B65D 5/50
U.S. Cl. 206—44.11 5 Claims



1. A commodity package comprising a body of box-shape with a rectangular cross-section, said box-shaped body being made of paper, first, second and third parallel slits formed in a corner portion of said body transversely to the longitudinal axis of said body, said slits being spaced a predetermined distance from each other along said corner portion, weakened fold lines extending parallel to each other and parallel to the longitudinal axis of the body and extending between respective ones of said slits to define two separate corner portions of said body bent inwardly of the body to form an auxiliary container portion, defined at each end by right angle intersecting sides, one of said first and third slits on opposite sides of said second slit extends from said corner portion of said body along said right angle intersecting sides to an extent less than the others of said slits so as to form an inwardly bent reduced-sized portion of said auxiliary container portion at one axial end thereof functioning as a stopper means and abutting one end of said auxiliary commodity when positioned therein to prevent rattling of the auxiliary commodity contained in said auxiliary container portion with contact being effected between edges of said reduced-sized portion of said auxiliary container portion and said one end of said auxiliary commodity when positioned within said auxiliary container portion, and a transparent cover member attached to said body to cover at least said auxiliary container portion containing the auxiliary commodity therein.

4,957,203
GARMENT COVER
William T. Gilchrist, Jr., 935 Brookridge Dr., Camden, Ark. 71701
Filed Dec. 20, 1989, Ser. No. 453,855
Int. Cl.[5] B65D 85/18
U.S. Cl. 206—286 4 Claims

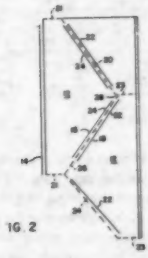
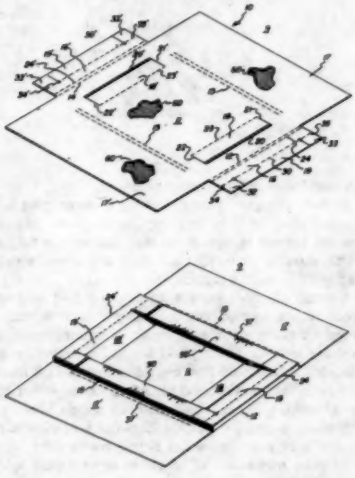


FIG. 2

4. A roll of garment covers comprising a first sheet of flexible material, a first line of perforations extending in a zig zag pattern lengthwise of the sheets, a selected portion of said sheets being bonded together adjacent each side of said perforations, a second line of perforations extending laterally from said first line of perforations to one edge of said sheets, and a third line of perforations extending from said first line of perforations to the other edge of said sheets.

4,957,204
CONTAINER FOR PACKAGING CARPENTER SQUARES
Ronald J. Dooley, 9 Rensselaer St., Hoosick Falls, N.Y. 12090
Filed Sep. 15, 1989, Ser. No. 407,540
Int. Cl.[5] B65D 85/28
U.S. Cl. 206—371 22 Claims



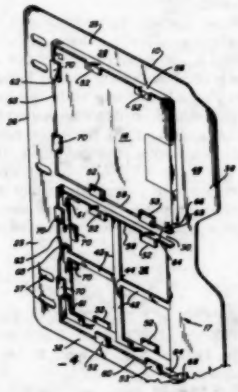
1. A container for packaging carpenter squares comprising:
(a) a substantially rectangular bottom panel capable of supporting carpenter squares arranged end to end in a rectangular pattern;
(b) a pair of tuck flaps extending from first and second edges, respectively, of said bottom panel and configured for folding over a portion of said carpenter squares, each tuck flap having an interlock flap extending therefrom configured for tucking underneath an opposing receiving flap; and
(c) a pair of receiving flaps contained in said bottom panel, each receiving flap being configured and positioned to receive the opposing interlock flap thereunder and hold said interlock flap in place through interaction with said interlock flap.

4,957,205
COMPUTER DISK HOLDER
Robert D. Rose, Jr., 2635 S. Santa Fe Dr., Denver, Colo. 80223
Filed Feb. 16, 1989, Ser. No. 311,713
Int. Cl.[5] B65D 85/57
U.S. Cl. 206—444 18 Claims

1. A disk holder for storing a plurality of computer disks in a snap ring loose-leaf notebook for storing documentation and said disk holder, said disk holder comprising in combination, a generally rectangular frame adapted to be retained in the notebook and having a front surface and a back surface, said rectangular frame including a longitudinal ring member to which said notebook snap rings connect, a longitudinal tab member extending parallel to and spaced from said ring member, said ring

member and tab member being integrally joined by a transverse top member, a transverse middle member, and a transverse bottom member, said transverse members, ring member and tab member defining two compartments on each of said front and back surfaces, each said compartment having means for receiving and aligning a disk inserted therein, selected edges of said receiving means having tabs formed thereon defining means for retaining said disk in said compartment, means associated with said retaining means for contacting and biasing said disk against said retaining means whereby four disks, two mounted on either surface of said disk holder, can be held in said disk holder.

6. A disk holder for storing a plurality of computer disks in a snap ring loose-leaf notebook for storing documentation and said disk holder, said disk holder comprising, in combination, a generally rectangular frame adapted to be retained in the notebook and having a front surface and a back surface, said frame including parallel laterally extending spaced apart top, middle and bottom transverse members, parallel longitudinally extending spaced apart ring and tab members integral with said transverse members and defining therewith a top and a bottom opening on said front and back surfaces, and cross-members integral with said transverse members, ring and tab members extending across each of said openings, and each of said openings defining a compartment selectively registrable with a disk,



each compartment having means for receiving and aligning a disk inserted therein, selected edges of said receiving means having tabs formed thereon defining means for retaining said disk in said compartment, and means associated with said retaining means for contacting and biasing said disk against said retaining means, whereby disks can be retained and stored on said front and back surfaces.

9. A disk holder for storing a plurality of disks in a snap ring looseleaf notebook for storing documentation and said disk holder, said disks defining spaced holes in one surface thereof, said disk holder comprising in combination, a generally rectangular frame adapted to be retained in the notebook and having a front surface and a back surface, each of said front and back surfaces defining at least one compartment having means for receiving and aligning a disk inserted therein, means on said front and back surfaces for releasably retaining said disk in said compartment of said disk holder, and means for releasably contacting said inserted disk and biasing said disk against said retaining means, said retaining means comprising nipples formed on said front and back surfaces for engaging in said holes formed in said disks.

14. A disk holder for computer disks releasably connected to a loose-leaf notebook having snap rings for retaining documentation and said disk holder, comprising, in combination:

a generally rectangular frame having a front and a back surface and including a longitudinal ring member having elongated openings formed therein for connection to said snap rings of said notebook and an opposed parallel tab member having integral tabs projecting away therefrom, said ring member and said tab member interconnected by a transverse top member, a transverse middle member and a transverse bottom member, defining therebetween a top opening and a bottom opening in said frame;

a top guiderail, middle guiderail and bottom guiderail formed along said top, middle and bottom transverse members and on each of said front and back surfaces, defining guide means for guiding said disks into said disk holder;

first inverted L members integrally mounted to the front and back surfaces of said frame for retaining an edge of selected ones of said disks, said first L members mounted to each of said front and back surfaces along said guiderails;

second inverted L members integrally mounted to the front and back surfaces of said frame for retaining a second edge of selected ones of said disks, said second L members mounted to each of said front and back surfaces along a stop member; and

bias means for engaging said disks mounted to the front and back surfaces of the frame and associated with each of said top and bottom openings near said first inverted L members, whereby said first inverted L members receive said edge of said disk as said disks engage said bias means and said second edge of said disk is received by said second inverted L members.

4,957,206

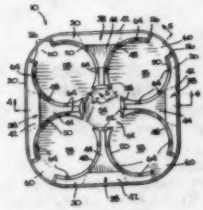
DEVICE FOR STORING A PLURALITY OF DISHES OR THE LIKE IN A PLURALITY OF STACKS

Ronald C. Banko, North Wales; Robert J. Cohn, Dallas, and John H. Welsch, Moscow, all of Pa., assignors to InterMetro Industries Corporation, Wilkes-Barre, Pa.

Continuation of Ser. No. 97,836, Sep. 17, 1987, abandoned. This application Aug. 30, 1989, Ser. No. 401,503

Int. Cl.[5] A47G *19/00*

U.S. Cl. 211—40 **41 Claims**



39. A device for storing a plurality of objects, such as dishes or the like, in a plurality of stacks in a plurality of object-receiving regions, said device comprising:

means for supporting said plurality of objects and including a generally rectangular base; and

means for partitioning the space extending above said supporting means into at least four object-receiving regions, wherein said partitioning means defines a pair slits adjacent each object-receiving region, wherein said slits in each said pair are spaced substantially diametrically opposite from each other relative to one said object-receiving region, wherein one said slit is positioned directly above each of at least two diagonally opposed corners of said base, and wherein said partitioning means partitions the space extending above and surrounding the center of said supporting means into a central open region,

said partitioning means further comprising four partition each having two object-receiving region-defining surfaces, wherein each object-receiving region is defined by

a pair of object-receiving region-defining surfaces of different partitions, wherein each partition is generally T-shaped having first and second portions, wherein said first portion forms an outer wall of said device, wherein said second portion comprises said two object-receiving region-defining surfaces, wherein an interior end of said second portion of each partition borders on said central open region and is spaced a distance from an axis perpendicular to said supporting means and extending through the center of said supporting means, wherein said interior ends of each pair of said second portions of each pair of object-receiving region-defining surfaces are spaced apart from each other, wherein the space between said interior ends of each pair of second portions of each pair of object-receiving region-defining surfaces forms one of said slits in each pair of slits in each object-receiving region, and wherein the exterior ends of each pair of second portions of each pair of object-receiving region-defining surfaces are spaced apart to form the other of said slits in each pair of slits in each object-receiving region.

4,957,207

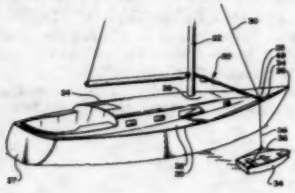
EXTENSIBLE HOIST FOR A NATERO VESSEL

Barclay L. Thomas, 24800 Highway One, Fort Bragg, Calif. 95437

Continuation of Ser. No. 145,974, Jan. 20, 1988, abandoned, which is a continuation of Ser. No. 762,720, Aug. 5, 1985, abandoned. This application Feb. 9, 1989, Ser. No. 308,417

Int. Cl.[5] B66C *23/52*

U.S. Cl. 212—192 **5 Claims**



1. An apparatus for shifting a load between spaced positions, said apparatus comprising, in combination:

(a) a support beam having a plurality of telescopically oriented tubular sleeve portions of progressively smaller diameter;

(b) a vertical support member;

(c) first means for coupling one end of the largest diameter one of said plurality of telescopically oriented tubular sleeve portions to said vertical support member at a first location thereon with freedom for pivotal movement about a vertical axis;

(d) cable support drum means mounted on said support beam, said cable support drum means having a cable secured at one end to said support drum means and wound thereabout with the opposite free end of said cable passing through said plurality of telescopically oriented tubular sleeve portions and exiting therefrom through one end of the smallest diameter one of said tubular sleeve portions, said free opposite end of said cable including means for separably attaching said cable to the load to be shifted;

(e) means for shifting said plurality of telescopically oriented tubular sleeve portions axially relative to one another so as to selectively elongate and shorten said support beam, said means for shifting said plurality of telescopically oriented tubular sleeve portions including:

(i) a toothed rack secured to the outer surface of, and extending axially along, one of the smaller diameter tubular sleeve portions;

(ii) a worm gear mounted on the free end of the next larger tubular sleeve portion and drivingly coupled to said toothed rack;

(iii) a circular rack mounted on said support beam, said circular rack having a socket for receiving a removable winch handle;

(iv) a pinion gear meshed with said circular rack;

(v) a drive shaft drivingly connected at one end to said worm gear and at its other end to said pinion gear so that upon insertion of a winch handle into said socket and rotation thereof said smaller diameter tubular sleeve portion is caused to move axially relative to said next larger tubular sleeve portion so as to elongate or shorten said support beam;

(vi) a plurality of latch openings formed axially along the length of one of said tubular sleeve portions; and,

(vii) at least one outwardly biased depressible latch button formed on the next smaller diameter one of said telescopically oriented tubular sleeve portions so that said next smaller diameter one of said telescopically oriented tubular sleeve portions can be shifted axially relative to the immediately adjacent outer one of said tubular sleeve portions by depressing said outwardly biased button inwardly through one of said openings and shifting said next smaller diameter tubular sleeve portion axially relative to the next adjacent outer tubular sleeve portion until said outwardly biased button snaps into a different latch opening on said adjacent outer tubular sleeve portion;

(f) second means coupled to said one end of said smaller diameter one of said tubular sleeve portions of said support beam for coupling said support beam to said vertical support for pivotal movement about a horizontal axis, said second coupling means being vertically spaced from said first coupling means so that said support beam can be maintained in a substantially horizontal plane at all operative lengths and pivotal positions about said vertical axis; and,

(g) means for controllably unwinding and winding said cable about said cable support drum means so as to permit the operator of said apparatus to shift a load between spaced positions.

4,957,208

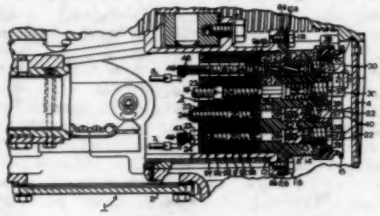
MULTIPLE CONTACT ELECTRICAL CONNECTOR PORTION FOR AN AUTOMATIC RAILWAY COUPLER

Cuong Manh Ta, Taylors, S.C., assignor to American Standard Inc., Spartanburg, S.C.

Filed May 24, 1989, Ser. No. 356,143

Int. Cl.[5] B61G *5/06*

U.S. Cl. 213—1.3 **20 Claims**



1. An electrical connector portion for an automatic railway car coupler comprising, a slide frame connectable to the electrical connector portion, a multiple contact unit carried by said slide frame, said multiple contact unit includes an outer insulative block having a plurality of aligned apertures for accommodating a plurality of movable and stationary contact elements and including an inner insulative block constructed of a plurality of stacked jumper plates, each of said jumper plates having

a plurality of aligned holes for accommodating a plurality of conductive studs which are electrically connected to the respective movable and stationary contact elements and, in turn, which are electrically connected to selected train line conductors.

4,957,209

EMERGENCY WATER BOTTLE

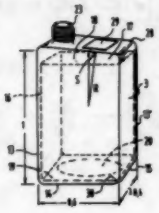
Stig-Aake Helin, Goeteborg, Sweden, assignor to Tansaktor KB International, Goeteborg, Sweden

Continuation of Ser. No. 6,498, Jan. 16, 1987, Pat. No. 4,832,965. This application Dec. 8, 1988, Ser. No. 281,214

Claims priority, application Fed. Rep. of Germany, May 17, 1985, 8514691[U]; Dec. 19, 1985, 3545116, PCT Int'l Appl., May 16, 1986, P86/00298

Int. Cl.[5] B65D *1/02, 23/08*

U.S. Cl. 215—1 C **17 Claims**



1. A bottle used for storing an emergency water ration, said water being capable of sterilization with heat while it is present in said bottle, and said bottle being structured to resist external shock and environmental stress which comprises

an inclined top surface, a bottom surface having a concave construction and side walls, said top surface bottom surface and side walls connecting with each other at edge having inside radii of at least 5 mm,

a pouring spout disposed at one side of the inclined top surface adjacent to the edge thereof, said pouring spout having a neck which is connected to the inclined top surface in a smooth, curved transisitional manner, and

a locking plug adapted for engagement with said pouring spout, said bottle and said locking plug being made of high density polyethylene.

4,957,210

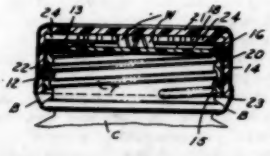
CHILD RESISTANT CLOSURE

Maximillian Kusz, Waterville, Ohio, assignor to Owens-Illinois Closure Inc., Toledo, Ohio

Filed Oct. 16, 1989, Ser. No. 422,219

Int. Cl.[5] B65D *55/02*

U.S. Cl. 215—220 **2 Claims**



1. A child resistant closure comprising:

an inner closure and an outer closure,

means for retaining the inner closure member within the outer closure,

said means permitting limited axial movement of the inner closure within the outer closure member,

said inner closure member comprising a base wall,

a skirt depending from the periphery of said base wall,

threads formed on the inside of said skirt to engage corresponding threads formed on a container finish,

and a set of radially aligned lugs formed on the top of said base wall,

said outer closure member comprising a base wall,

a skirt depending from the periphery of said outer base wall,

and a set of depending radial lugs integrally formed on the inside surface of said outer base wall,

said sets of lugs constructed and arranged to interengage when said panels are brought together, both sets of lugs having vertical, generally radially extending side surfaces constructed and arranged to abut each other when the outer closure member is rotated in the direction for application of the safety closure,

one of said sets of lugs having inclined, generally radially extending side surfaces, constructed and arranged to abut the edges of the other of said sets of lugs when the other closure is rotated in the direction for removal, whereby said sets of lugs will cam out of engagement when the outer closure member is rotated in the direction for removal, unless a firm downward force is applied to said outer closure member,

a tamper indicating band comprising a heat shrunk band over said outer closure and a portion of said container,

at least one flexible wing extending from one of said outer closure member and inner closure member and yieldingly resisting axial movement between said members such as to hold the outer closure member out of loosening engagement with the inner closure member when the band is heat shrunk over the closure and a portion of the container,

the force to deflect the wing being sufficient to hold the outer closure out of loosening engagement when the band is shrunk on the closure and the force being substantially less than the axial force necessary to engage the lugs and prevent the lugs from camming out of engagement in order to move the inner closure member and outer closure member into engagement after the band is removed for loosening the closure during removal of the closure from the container.

4,957,211

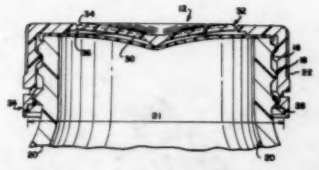
VACUUM-INDICATING CLOSURE

Len Ekkert, Lemont; Charles A. Webster, Oak Lawn, and Paul R. Hansen, Kildeer, all of Ill., assignors to American National Can Company, Chicago, Ill.

Filed Jul. 11, 1989, Ser. No. 378,057

Int. Cl.[5] B65D *41/04*

U.S. Cl. 215—230 **5 Claims**



1. A vacuum-indicating closure comprising a top wall adapted to extend across and provide a seal for neck finish of a container and a skirt extending downwardly from a periphery of said top wall and having a member for securing said closure, the improvement comprising means defining a deflectable center portion in said top wall, said deflectable center portion having radially-extending thinned portions to divide said center portion into segments joined to each other by said thinned portions so that said center portion moves between a

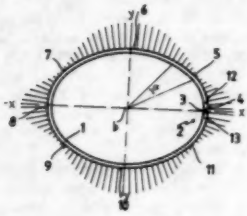
generally outward convex configuration to a generally concave configuration depending upon the presence or absence of vacuum in the container.

4,957,212

NON-CIRCULAR PISTON RINGS

Gerhard Dück, Burscheid; Hans-Rainer Brillert, Odenthal, and Albin Mierbach, Leverkusen, all of Fed. Rep. of Germany, assignors to Goetze AG, Burscheid, Fed. Rep. of Germany

Continuation of Ser. No. 858,494, Apr. 30, 1986, abandoned.
This application Oct. 26, 1988, Ser. No. 263,964
Claims priority, application Fed. Rep. of Germany, May 2, 1985, 3515629
Int. Cl.[5] F16J 9/00, 9/12
U.S. Cl. 277—217 4 Claims



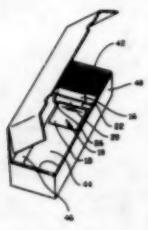
1. A piston ring for a non-circular engine cylinder, which cylinder has a wall contacted by the ring, the cylinder being in an engine which is in a cold state before being placed into operation, said ring having a plurality of first circumferential regions spaced apart around the circumference of said ring and each having a defined radius of curvature which differs from one first region to the next around the circumference of said ring, and a plurality of second circumferential regions each interposed between two succeeding first regions and each formed to effect a transition between the radii of curvature of the two succeeding first regions, wherein said second regions are configured for exerting on the cylinder wall a radial contact pressure which is less than that exerted by said first regions when said ring is installed in the cylinder and the engine is in its cold state.

4,957,213

CARD FILE STOP

Dennis H. White, 308 Ries Rd., Ballwin, Mo. 63021, and Danny W. Schoenwalder, 157 E. Forest Parkway, Valley Park, Mo. 63088

Filed Mar. 5, 1990, Ser. No. 488,691
Int. Cl.[5] B65D 1/24
U.S. Cl. 220—559 9 Claims



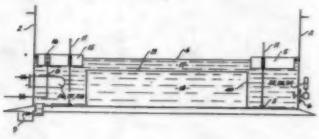
1. A file stop support for use in a file drawer or the like comprising a plate-like member and a tubular telescoping element, said member having a base portion and an upright portion, said tubular telescoping element being attached to a back side of said upright portion in an orientation transverse to side walls of said drawer, said tubular telescoping element having two ends, at least one of said ends axially extending out to engage in biased relation said side walls of said drawer.

4,957,214

MODIFICATION TO FLOATING ROOF TANK DESIGN

Leslie M. Lenny, Caringbah, Australia, assignor to California Texas Oil Corporation, Irving, Tex.

Continuation of Ser. No. 910,298, Sep. 17, 1986, Pat. No. 4,790,447, which is a continuation of Ser. No. 723,008, Apr. 16, 1985, abandoned, which is a continuation of Ser. No. 531,506, Sep. 12, 1983, abandoned. This application Aug. 24, 1988, Ser. No. 235,606
Claims priority, application Australia, Sep. 13, 1983, PF5853
The portion of the term of this patent subsequent to Dec. 13, 2005, has been disclaimed.
Int. Cl.[5] B65D 88/40
U.S. Cl. 220—220 64 Claims



23. A floating roof storage tank, comprising:

a tank shell supported by a fixed base and a floating roof buoyantly supported by liquid stored in said tank, said roof including legs of negligible volume projecting downwardly therefrom to support said roof at a minimum operating stored liquid level in said tank;

a displacement mass located within said tank to substantially fill the volume between said base and said roof when said roof is at a minimum level, wherein said replacement mass within said tank is of substantially constant volume and configuration, said volume and configuration being geometrically determined by at least one fixed surface, the constant volume of said displacement mass reducing the volume of said stored liquid able to be stored in said tank to less than the nominal capacity of said tank.

4,957,215

SEGMENTED NOZZLE DAM

Cliff Evans, 207 Chestnut Ridge, Bethel, Conn. 06801, and Jagdish H. Shah, 4 Beechwood Ct., Woodbury, Conn. 06798

Filed Feb. 13, 1989, Ser. No. 310,316
Int. Cl.[5] F16L 55/12
U.S. Cl. 220—232 13 Claims

1. A nozzle dam for sealing a nozzle against flow of a first fluid through the nozzle, said nozzle having an inner wall forming a frustoconical opening, and a ring mounted by a bottom end about said opening, said ring being adapted for receiving fastening means around the top of said ring, the inner diameter of said ring being for receiving sealing means; said nozzle dam comprising:

a disk including a top and a bottom, said disk further comprising a first portion having a first diameter near the top, a second portion having a second diameter, and a third portion having a third diameter, said first, second and third diameters being generated on a first axis,

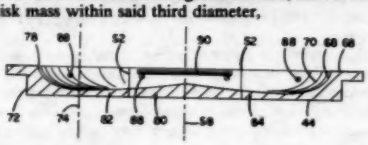
said disk further including an annular, radial flange between said first and second diameters,

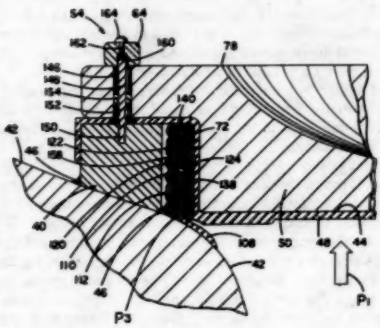
the first diameter of said disk being greater in size than the inner diameter of said ring,

the second diameter of said disk being less in size than the inner diameter of said ring so that an annulus for sealing

means is formed between the ring and the disk, when the disk is located on the ring with the second diameter concentric with the inner diameter of the ring,

said third diameter portion comprising a circular portion that is concentric with said first axis and thinner, measured in solid cross section, than the central portion of said disk at said first axis measured in solid cross section, said circular portion being contoured for resistance to stress from pressure of said first fluid against the disk, and for reduced disk mass within said third diameter,





said flange including openings for threaded fasteners, said openings being so located on the flanges that they may be aligned with tapped openings in the top end of said ring, for fastening said disk to said ring,

said nozzle dam further comprising sealing means expandable by a second fluid under pressure, said sealing means being located on the second diameter portion for sealing between the disk and the ring by expanding within the annulus, and

means for delivering said second pressurized fluid to the sealing means.

4,957,216

ANCHOR FOR PLASTIC CAP

Robert L. LaBarge, Ben Avon Borough, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Apr. 17, 1989, Ser. No. 338,580
Int. Cl.[5] B65D *55/00*
U.S. Cl. 220—379 **9 Claims**

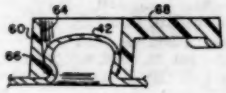
1. A closure for closing the open mouth of a container comprising:

an end wall having a score line defined panel defining a pouring opening therein for dispensing of the container contents,

means around the periphery of the end wall for attaching the closure to a container,

a flexible resealing cap assembly pivotally secured to said end wall and rotatably displaceable about the locus of securement thereof for transposition immediate a first location remote from said score line defined opening panel in said end wall and a second location in overlying sealing relation with said pouring opening therein, and

means for releasably anchoring said cap assembly in interfacial abutting relation with said end wall at said first location, wherein said anchoring means includes upwardly extending button means in said end wall positioned in spaced relation from said score line defined panel therein and from said peripheral attaching means, and a flexible sleeve member included in said cap assembly sized to



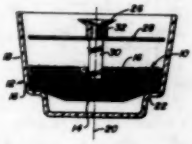
elastically surround said button means for releasable engagement therewith.

4,957,217

COFFEE FILTER PAPER DISPENSER

Wilbur Ritson, 820 E. Cameron Ave., West Covina, Calif. 91790

Continuation of Ser. No. 217,371, Jul. 11, 1988, abandoned. This application Nov. 3, 1989, Ser. No. 431,688
Int. Cl.[5] B65G *59/00*
U.S. Cl. 221—210 **11 Claims**



1. A dispenser of individual coffee filter papers from a stack of such papers, wherein each filter paper has a circular plan area including a central flat area and a radially corrugated annular peripheral area, the papers being stacked with their central areas in close contact, with their peripheral areas extending outwardly and upwardly and with the corrugations thereof in nesting relation,

said dispenser comprising:

an open-topped container having an inner wall surface defining a cross-sectional area sized in relation to the circular plan area of the filter paper stack that frictional engagement between the inner wall surface and the outer peripheral edge surfaces of the papers is minimized, whereby the filter papers may be rotated about a central axis of the central flat areas of the papers without distortion of the papers by engagement with the container inner wall surface, and whereby individual filter papers may be drawn upwardly through the open top of the container without substantially deforming the papers,

a dust cover disposed in the container atop the stack of

filters papers, and having thereon manual engagement means for facilitating grasping of the dust cover,

a central post element extending downwardly from the dust cover and having an end face engagable with the central flat area of the uppermost paper in the filter paper stack, and

a contact adhesive material on the lower face of the post element to exert a gripper force on the uppermost filter paper,

whereby upon manual rotation of the dust cover the uppermost paper in the stack is rotated to cause the corrugations thereof to ride over the corrugations of the next lower paper so that the corrugations of the two papers are out of phase and registration and not adhered, thus to permit ready and convenient lifting of the uppermost paper from the stack by lifting of the dust cover.

4,957,218

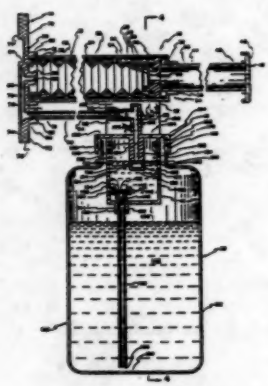
FOAMER AND METHOD

George W. Ford, Jr., Salt Lake City, Utah, assignor to Ballard Medical Products, Midvale, Utah

Filed Jul. 28, 1986, Ser. No. 890,041

Int. Cl.[5] B67D *5/58*; B65D *83/00*

U.S. Cl. 222—1 **4 Claims**



1. A method for repeatedly forming and dispensing small quantities of foam by entraining air within a foamable liquid in a foaming device successively over an extended period of time without need to replenish the supply of foamable liquid in the device, comprising the steps of:

storing a large quantity of foamable liquid in a large container;

transferring a small predetermined quantity of foamable liquid from the large container along a one-way fluid flow passage to an elevated small pump chamber under force of negative pressure at successive points in time;

terminating the transferring step by flow control action after each said small predetermined quantity of foamable liquid has been accumulated within the elevated small pump chamber;

displacing at least a substantial portion of a known amount of the foamable liquid contained within the small pump chamber from the small pump chamber to a foam-producing site as a liquid stream under force of manually-derived positive pressure;

delivering a regulated flow of air under said force of manually-derived positive pressure to the foam-producing site;

causing a confluence at the foam-producing site by continuously merging the stream of foamable liquid and the flow of air under force of said manually-derived positive pressure to produce foam at the foam-producing site;

displacing the foam along an effluent foam flow path from the foam-producing site to a foam output site;

terminating the delivering step and the causing step, and the two displacing steps by flow control action when the known substantial portion of the small quantity of foamable liquid initially contained within the small pump chamber has been discharged from the small pump chamber to the foam-producing site.

2. A foam-dispensing device comprising:

a relatively large container for holding a supply of foamable liquid;

a relatively small elevated pump chamber for selectively receiving at successive points in time a relatively small definitive amount of said foamable liquid from the large container under force of negative pressure along first flow path means comprising suction tube means and one-way flow control means;

foam-producing means juxtaposed the large container and the pump chamber, the foam-producing means defining a juncture between (a) foam effluent means, (b) foamable liquid influent means and (c) air influent means;

source means by which pressure is obtained;

liquid passageway means by which a predetermined quantity of foamable liquid from the small pump chamber is selectively delivered to the foam-producing means at the liquid influent means;

air passageway means by which the force of positive pressure from the source means is imposed upon the foamable liquid contained within the pump chamber thereby forcing flow of said predetermined quantity of foamable liquid from the pump chamber along the liquid passageway means with a controlled amount of air under said positive pressure being displaced along the air passageway means through the air influent means into the foam-producing means to foam the flowing foamable liquid as it passes through the foam-producing means;

second flow control means accommodating imposition of the force of negative pressure through the interior of the pump chamber, through the one-way flow control means and through the interior of the suction tube means to draw another definitive amount of foamable liquid from the large container up the suction tube means, across the one-way flow control means and into the pump chamber to recharge the pump chamber with foamable liquid;

the second flow control means terminating each said displacement of foamable liquid into the elevated pump chamber when the definitive amount of foamable liquid has been so displaced to the pump chamber.

4,957,219

MEASURING AND DISPENSING CAP

E. Stanley Robbins, P.O. Box 174, Killen, Ala. 35645, and Rodney W. Robbins, 207 Cherokee Rd., Nashville, Tenn. 37205

Filed Jan. 31, 1989, Ser. No. 304,122

Int. Cl.[5] G01F *11/20*

U.S. Cl. 222—39 **7 Claims**

1. A metering and dispensing cap apparatus attachable across the mouth of a container comprising:

a cap body arranged to be removably secured to said container and disposed horizontally when said container is in an inverted, vertically disposed position;

said cap having an aperture communicating with the interior of said jar;

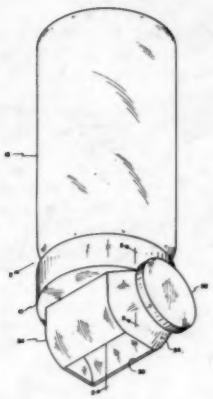
an integrally formed housing mounted on the outside of said cap body enclosing said aperture and having a pair of opposed, outwardly extending end portions and inwardly curved side portions terminating in an outer rectangular aperture spaced apart from said aperture of said cap body, said housing including in each end portion a circular, shaft-receiving aperture, one of said end portions having an inner face and an outer face, said outer face having defined therein an axially disposed, spring-receiving hole;

a metering rotor disposed in said housing between said apertures with its axis perpendicular to said container mouth;

said rotor having defined therein a plurality of circumferentially spaced-apart cavities of equal volumes and a central, circular opening extending axially therethrough;

a shaft extending axially through said opening in said roto. and engaging said shaft-receiving aperture;

a knob mounted on said shaft for turning said rotor, whereby said cavities may be sequentially filled with material in



said container upon being in communication with the interior thereof and emptied upon being in communication with said housing aperture, said knob including detent-receiving indentations in a side face opposing said spring-receiving hole;

detent means disposed in contact with said spring so as to be biased against said knob face and to be removably forced into said indentations upon turning of said rotor; and

means providing wiping action for levelling off said cavities upon being rotated.

4,957,220

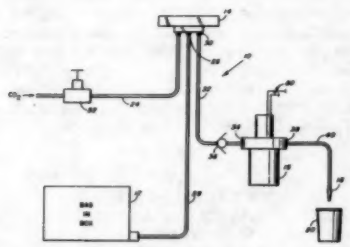
VENDING MACHINE LAST DRINK SENSOR AND DISPENSING APPARATUS

Benjamin R. Du, 32392 Via Antibs, South Laguna, Calif. 92677

Filed Dec. 6, 1988, Ser. No. 280,679

Int. Cl.[5] B67D *5/08*

U.S. Cl. 222—66 **14 Claims**



1. A beverage syrup dispensing apparatus for use in vending machines comprising:

a bag-in-box beverage syrup container adapted to store beverage syrup therein;

a nozzle formed to dispense said beverage syrup with a proportional quantity of a mixing fluid;

a pump disposed between said beverage syrup container and said nozzle for delivering syrup from said container to said nozzle; and

means disposed between said pump and said nozzle for accumulating and dispensing a quantity of said syrup to said nozzle sufficient for vending at least one last beverage from said vending machine after a syrup depletion condition occurs within said bag-in-box syrup container, the syrup depletion condition occurring when said bag-in-box beverage syrup container becomes substantially empty of beverage syrup;

wherein the syrup depletion condition causes said means to dispense at least one beverage from said vending machine.

4,957,221

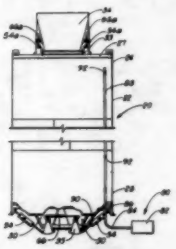
AIR TIGHT STORAGE SILO

Stuart W. Murray, Edmond, Okla., assignor to CMI Corporation, Oklahoma City, Okla.

Filed Jan. 3, 1989, Ser. No. 292,904

Int. Cl.[5] B65D *85/00*

U.S. Cl. 222—129 **11 Claims**



1. A silo, comprising:

a vertically extending vessel having a receiver opening at the upper end thereof;

a batcher, having a hopper and a hopper discharge opening, secured to the vessel above the receiver opening, with the receiver opening and the hopper discharge opening vertically aligned;

a gate for selectively closing the receiver opening;

a first shaft secured to the batcher;

at least one gate arm secured to an end of the gate and pivotally secured on the first shaft, said gate arm being positioned external to a flow path formed by said receiver opening and said hopper discharge opening;

means for swinging the gate arm about the first shaft to move the gate alternately over and away from the receiver opening and under and away from the hopper discharge opening;

means for lowering the first shaft and the gate when the gate is over the receiver opening; and

a deformable sealing member secured to the vessel around the receiver opening in a position to be engaged by the gate when the gate is lowered to seal off the receiver opening.

4,957,222

BARREL SCRAPER

John I. Rolfe, 337 Riverview Dr., Youngstown, N.Y. 14174

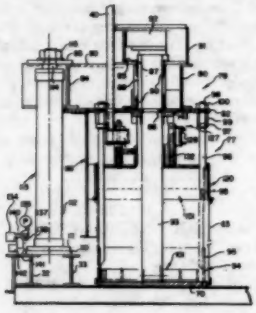
Filed Feb. 8, 1989, Ser. No. 307,517

Int. Cl.[5] B08B *9/38*

U.S. Cl. 222—148 **23 Claims**

1. An apparatus for removing settled out material from a barrel, said apparatus comprising a barrel support, a barrel scraper for scraping the interior of a supported barrel, means

for fixing a barrel relative to said barrel support in a preselected position, and means for effecting axial relative movement between said barrel support and said barrel scraper, said barrel support including a rigid barrel end engaging anvil, and



means for moving a supported barrel carried by said barrel support and said anvil relative to one another to a seat a barrel bottom on said anvil while such a barrel is still seated on said barrel support.

4,957,223

DISPENSER GUN

Moishe Beilush, 1431 - 52nd St., Brooklyn, N.Y. 11219

Filed Aug. 14, 1989, Ser. No. 393,252

Int. Cl.[5] B65D *88/54*

U.S. Cl. 222—340 **25 Claims**

1. A dispenser gun for flowable materials comprising:

a hollow tubular body member for receiving a cartridge of flowable material therein;

a removable cap member disposed on a front end of said body member to hold the cartridge within said body member with a nozzle of the cartridge extending outwardly through an opening in said cap member;

spring means disposed within a rear portion of said body member for providing a spring force upon the cartridge to dispense the flowable material from the cartridge through the nozzle;

cable means being connected to said spring means for controlling said spring force of said spring means on the cartridge;

retaining means for engaging said cable means in a locked position so that said cable means prevents said spring means from providing said spring force on the cartridge, and for releasing said cable means into a released position so that said cable means permits said spring means to provide said spring force upon the cartridge;

release means for moving said retaining means out of engagement with said cable means so that said cable means is in said released position, and for permitting said retaining means to move into engagement with said cable means so that said cable means is in said locked position;

said cable means including a cable extending at least from said retaining means to said spring means;

said spring means including a coil spring and a pressure block secured to a forward end of said coil spring for acting upon the cartridge, said cable being connected to said pressure block; and

said cable extending forwardly through a first hole in said pressure block, and being looped rearwardly back through a second hole in said pressure block so that a rear end of said cable extends towards a rear wall of said body member;

whereby the flowable material is only dispensed from the cartridge when said cable means is in said released position.

4,957,224

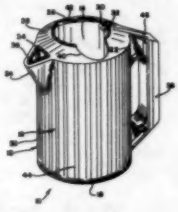
MULTI-SPOUTED SERVING PITCHER

William Kessler, Sheboygan, and Gerald J. Champeau, Manitowoc, both of Wis., assignors to The Vollrath Company, Inc., Sheboygan, Wis.

Continuation of Ser. No. 192,489, May 11, 1988, abandoned. This application Sep. 14, 1989, Ser. No. 407,724

Int. Cl.[5] A47G *19/14*

U.S. Cl. 222—465.1 **13 Claims**



1. An apparatus adaptable for retention and delivery of a liquid, the apparatus comprising:

a substantially planar base;

at least one wall;

a spill guard means for resisting spilling of said liquid; and

a handle;

said at least one wall terminating in an upper terminus and cooperating with said base to form a unitary liquid-retentive well; said well being substantially symmetrically disposed about a first axial plane and a second axial plane; said first axial plane being substantially perpendicular with said second axial plane;

said at least one wall lobularly deviating to provide an integral first spout, said first spout being substantially symmetrical about said first axial plane and depending outwardly from said well;

said handle depending from said at least one wall outwardly from said well; said handle being substantially symmetrical about said first axial plane;

said spill guard means comprising a skirt depending inwardly over said well from said upper terminus and terminating in an inner terminus; said inner terminus presenting a first lobe and a second lobe; said first lobe and said second lobe being substantially symmetrically disposed about said second axial plane; said spill guard means further comprising communication access means for facilitating flow of said liquid from said first spout.

4,957,225

REPLACEABLE CAULKING TIP FOR USE ON CAULKING CARTRIDGES AND METHOD OF MANUFACTURE

Steven M. Childers, 155 W. Clover Rd., Tracy, Calif. 95376

Continuation-in-part of Ser. No. 884,047, Jul. 10, 1986, abandoned. This application Oct. 14, 1988, Ser. No. 257,623

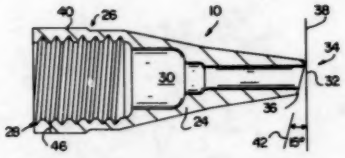
Int. Cl.[5] B65D *25/40*

U.S. Cl. 222—568 **22 Claims**

1. A caulking tip for replaceable use on a tubular nozzle of a

caulking cartridge or the like; said tip being adapted for caulking joints between angularly aligned surfaces; said tip comprising a tubular body having a passage therethrough and an opening at one end for attaching the caulking tip to the nozzle of the caulking cartridge and an outlet orifice at the other end;

said caulking tip having a longitudinal axis along the length of the tubular body and said outlet orifice having an elongated planar configuration wherein the orifice has a



greater dimension in one direction than in the other, thereby forming an axis of elongation;

said axis of elongation being on a line which is inclined from a plane perpendicular to the longitudinal axis; and

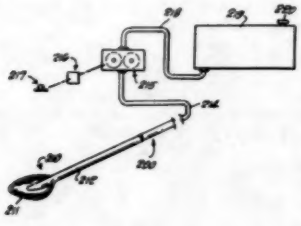
said orifice having two sides which are substantially parallel to each other and to the axis of elongation whereby the substantially parallel sides provide an elongated length for contacting angularly aligned surfaces of a joint during a caulking procedure.

4,957,226

AUTOMATIC FOOD DISPENSING METHOD, APPARATUS AND UTENSIL

Dante V. Pacia, Reno, Nev., assignor to Wells Manufacturing, Verdi, N.Y.

Filed Jun. 5, 1987, Ser. No. 58,470
Int. Cl.[5] B05D 1/00
U.S. Cl. 222—643 **4 Claims**



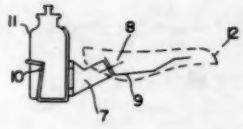
1. The method of dispensing food ingredients comprising: (1) placing the food ingredients to be dispensed in a supply container; (2) connecting a means to withdraw said food ingredients from the supply container to a pump at an inlet means; (3) connecting an outlet means of said pump to a food manipulating utensil by means of a hollow handle through which passes said food ingredients to said food manipulating utensil, said food manipulating utensil having a cavity for receiving said food ingredients; (4) activating said pump for a predetermined time thus causing a predetermined amount of said food ingredients to pass through said hollow handle and onto the cavity of the utensil so as to form a pool of food ingredient on the cavity, and then from the utensil onto a food product; (5) deactivating said pump when the desired amount of food ingredient has been transferred through said utensil; and (6) manipulating said utensil so as to place the dispensed food ingredient in the position desired with relation to the food product.

4,957,227

SADDLE MOUNTED BICYCLE WATER BOTTLE CARRIER

James Trimble, Natick, Mass., assignor to Trimble Design Inc.

Filed Apr. 10, 1989, Ser. No. 335,696
Int. Cl.[5] B62J 7/00, 11/00
U.S. Cl. 224—39 **9 Claims**



1. A carrier for one or more water bottles in combination with a bicycle seat saddle comprising:

a bicycle seat saddle having supports rails on an underside of the saddle;

said support rails having ends, one of the ends of the support rails positioned at the rear of the saddle;

a bracket having two ends, one end of the bracket attached to said one end of the support rails;

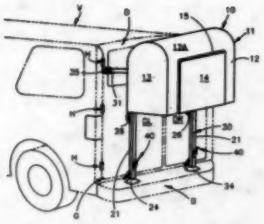
means attached to the other end of the bracket for supporting one or more water bottles.

4,957,228

CARGO CARRIER FOR VANS

Daniel R. Balka, 908 Clearview Ave., Jasper, Ind. 47546

Filed Apr. 5, 1989, Ser. No. 333,331
Int. Cl.[5] B60R 9/14, 9/06
U.S. Cl. 224—42.03 A **11 Claims**



1. A removable cargo carrier for use with van-type vehicles having a body, a bumper and a rear door assembly defining a groove between the body and the door assembly, comprising:

a cargo box including a number of walls defining an enclosure for carrying cargo and a door for providing access to said enclosure; and

a mounting frame including;

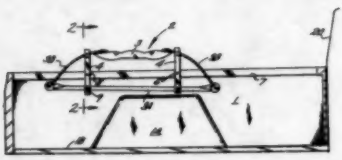
a pair of spaced apart elongated vertical members with means at the bottom of said pair of vertical members for abutting engagement with the bumper of the vehicle;

attachment means for attaching said cargo box to said pair of vertical members;

upper connecting means, proximate the top of said pair of vertical members, for connecting each of said pair of vertical members to the door assembly in a portion of the groove between the vehicle body and the door assembly at the opposite sides of the door assembly; and

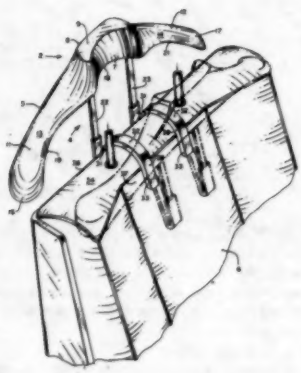
means for supporting said cargo box and its contents against the vehicle door assembly at a fulcrum point generally mid-length along said pair of elongated vertical members.

4,957,229
VEHICLE MOUNTED ARCHERY BOW HOLDER
Lowell J. D. Freeman, 26255 Highpass Rd., Junction City, Oreg. 97448
Filed Jan. 2, 1990, Ser. No. 459,977
Int. Cl.[5] B60R 9/00, 11/00
U.S. Cl. 224—42.45 R 9 Claims



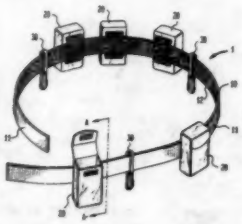
1. Bracket means for attachment to a truck for transporting an archery bow, said bracket means comprising,
a main member adapted at spaced apart points for upright engagement with the truck, a support on said main member for abutment with the truck, and
arm members on said main member and extending outwardly therefrom, one of said arm members including bow retention means, the other of said arm members including a retainer for engagement with the bowstring of the bow.

4,957,230
SEAT-SUPPORTED COAT HANGER FOR AUTOMOBILES
Arthur V. Gonzales, 400 E. Remington Dr. #239, Sunnyvale, Calif. 94087
Filed Sep. 22, 1989, Ser. No. 410,828
Int. Cl.[5] B60R 7/04; A47C 7/64
U.S. Cl. 224—42.46 A 8 Claims



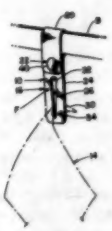
1. A coat hanger for use in an automobile having a cushioned seat including a back support portion having front, back and upper end surfaces for suspending a doffed coat in a wrinkle-free manner thereon, comprising:
(a) a main body portion having upper and lower surfaces and including a central coat collar supporting section and oppositely extending coat shoulder support sections; and
(b) means mounted on the lower surface of said main body portion adapted to detachably engage the back support comprising a pair of spaced straps each attached at one end to the main body portion and terminating at its opposite end in an inverted U-shaped clamping portion adapted to engage the cushioned back support portion of the automobile seat.

4,957,231
TACKLE BOX BELT
Sheila L. Kalisher, 94 N. Rockledge Dr., Livingston, N.J. 07039
Filed Oct. 13, 1989, Ser. No. 421,370
Int. Cl.[5] A45F 5/00
U.S. Cl. 224—151 4 Claims



1. A device for portable storage and transportation of fishing gear and personal items comprising a waist belt having selectively attachable first and second ends, one or a plurality of pockets selectively attachable to said waist belt, and one or a plurality of loop hangers selectively attachable to said waist belt, said waist belt including an outside surface formed from a hook portion of hook and loop fastener material extending for an entire length of said waist belt, and an inside surface formed from a loop portion of hook and loop tape fastener material extending for an entire length of said waist belt, said one or a plurality of pockets comprising a selectively fastenable envelope having a casing formed on the rear side of said envelope that includes an inner surface and an outer surface, the outer surface of said casing being formed from a loop portion of hook and loop tape fastener material, said one or a plurality of pockets thereby being alternatively attachable to said waist belt either by slidable engagement of said waist belt within said casing or by affixation of the outer surface of said casing with an outside surface of said waist belt.

4,957,232
HAND WIPE HOLDER
Gallen Sprague, 7759 Greenbush Ave., Van Nuys, Calif. 91402
Filed Apr. 28, 1989, Ser. No. 345,205
Int. Cl.[5] A45F 5/00
U.S. Cl. 224—253 3 Claims



1. A hand wipe holder, comprising:
a sheet-like body having a band portion of a length to fit around the top of a person's belt and having fasteners that fasten opposite ends of said band portion together to avoid it falling off the belt;
said body having a wipe-receiving portion depending from

said band portion, said wipe-receiving portion forming a primarily vertical tapered slot with its upper slot end widest to initially receive the corner of a hand wipe and with its lower slot end narrowest to grip the hand wipe when it is forced down along the slot.

said sheet-like body being formed of flexible but tough material with said slot formed as a hole therein, said slot walls flexing apart to receive the wipe and thereafter resiliently pressing toward each other to securely hold the wipe in place.

4,957,233

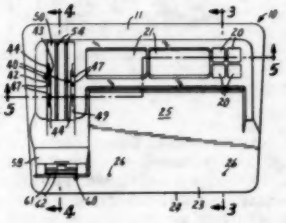
TAPE DISPENSER

Bruce E. Samuelson, West Lakeland, Township, County of Washington, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed May 12, 1989, Ser. No. 351,716

Int. Cl.[5] B26F *3/02*

U.S. Cl. 225—26 **6 Claims**



1. In a tape dispenser adapted to receive a tape roll of the type comprising a core having an axis, a cylindrical inner surface about the axis defining a through opening, and a length of tape helically wound about the core to provide a cylindrical outer surface for the tape roll, with the tape roll and core having generally planar opposite sides, said dispenser comprising a frame and means on the frame for supporting the tape roll for rotation about its axis to afford withdrawing tape from the roll in a first direction relative to the frame, the improvement wherein said means for supporting the tape roll comprises

opposed hub portions adapted to project axially into the through opening in the core from opposite sides to afford rotation of the tape roll around said hub portions, each of said hub portions including a distal plate like part elongate in said first direction and having an inner surface disposed generally parallel to and in opposition to the inner surface on the opposite hub portion, said plate like part having arcuate end surfaces disposed generally at right angles to said inner surface with one of said end surfaces facing toward said first direction and the other of said end surfaces facing away from said first direction, and cam parts on opposite sides of said plate like part defining cam surfaces having ends ending at said inner surface, said cam surfaces being disposed generally parallel to said first direction and diverging away from opposite sides of said inner surface, and

means for mounting one of said opposed hub portions for movement from a normal position spaced from the other of said hub portions to afford journalling of a said tape core on said hub portions, to a release position affording movement of a said tape roll or core between said inner surfaces of said opposed hub portions in a direction normal to the axis of said tape roll or core, and means for biasing said one hub portion to said normal position so that movement of the tape roll toward said inner surfaces of said opposed hub portions in a direction normal to the axis of the tape roll and normal to said first direction will cause the tape roll to engage said cam surfaces to move said one hub portion to said release position in opposition to said biasing means until said hub portions are aligned with and enter the central opening in the core under the influence of said biasing means whereupon said end surfaces will retain and journal the core around said hub portions during withdrawal of tape in said first direction, and so that upon subsequent movement of said core in a direction normal to the axis of the core and normal to said first direction the core will engage said cam surfaces to move said one hub portion to said release position to afford moving said core between said inner surfaces and out of said dispenser.

4,957,234

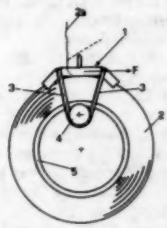
CUTTING DEVICE FOR ROLLS OF ADHESIVE TAPE

Giorgio Orlandini, Via Marinelli 39, Camerano (AN), Italy

Filed Jun. 3, 1988, Ser. No. 201,850

Int. Cl.[5] B65H *35/07*

U.S. Cl. 225—65 **3 Claims**



1. Device for cutting a roll of adhesive tape wound on a reel, said device comprised of:

a runner having a central flat section including a pair of opposite ends, two equal symmetrical inclined planes that bear lateral guiding edges, each inclined plane being positioned at a respective opposite end of the flat section, so that respective opposite end edges are defined therebetween, two transversal grooves formed along the opposite end edges where the central flat section and the inclined planes meet, a transversal cutting blade having a serrated edge protruding from the top of the flat section, the flat section having a transversal slot formed therein near the cutting blade from which the strip of adhesive tape emerges;

a pin including a pair of ends, the pin having two circular grooves formed therein, one at each end thereof, the pin having a length, such that said grooves protrude from either side of the reel, onto which the roll of adhesive tape is wound and through which the pin is inserted;

an elastic band, which passes over the runner the transversal grooves and is hooked at opposite sides to the two circular grooves of the pin inserted in the reel, around which the adhesive tape is wound.

4,957,235

PAPER TRIMMER

Steven J. Beno, and Joseph R. Mango, both c/o Ideal School Supply Corporation, 2245 Delany Rd., Waukegan, Ill. 60087

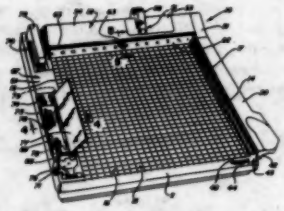
Filed Mar. 22, 1989, Ser. No. 326,929

Int. Cl.[5] B25C *7/00*

U.S. Cl. 227—156 **29 Claims**

1. A paper trimmer comprising:

a base defining an upper surface for supporting paper to be cut, opposite side edge portions, and a rear edge portion; a dispenser on said base rear edge portion; and



cutter means disposed at one of said side edge portions of the base for cutting a projecting portion of paper disposed on said base upper surface.

4,957,236

METHOD OF BRAZING PARTS OF TI-AL-NB ALLOY

Howard Mizuhara, Hillsborough, Calif., assignor to GTE Products Corporation, Stamford, Conn.

Division of Ser. No. 207,803, Jun. 17, 1988, Pat. No. 4,883,640.
This application Apr. 17, 1989, Ser. No. 339,846
Int. Cl.[5] B23K *1/04, 35/32*
U.S. Cl. 228—263.21 6 Claims

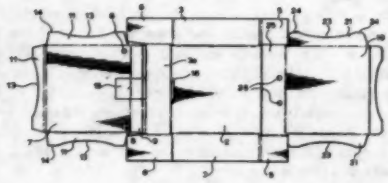
1. The method of joining metal parts made of a TiAlNb alloy having a solution heat treating temperature of about 1200° C. comprising the steps of disposing a brazing alloy at the joint between the parts, the brazing alloy having a brazing temperature between about 1020° C. to 1250° C. and having a composition of, in weight percent, 37–75 titanium 5–43 niobium, 20–58 nickel and brazing the parts at a temperature of about 1020° C. to 1250° C. to form a uniform fillet at the joint.

4,957,237

BOX WITH INTERNAL PLATFORM FOR VERTICAL STACKING OF PRODUCTS

Louis Madonna, Toronto, and Chris Garrett, Mississauga, both of Canada, assignors to Paperboard Industries Corporation, Mississauga, Canada

Filed Nov. 29, 1989, Ser. No. 442,672
Int. Cl.[5] B65D *5/48*
U.S. Cl. 229—120 9 Claims



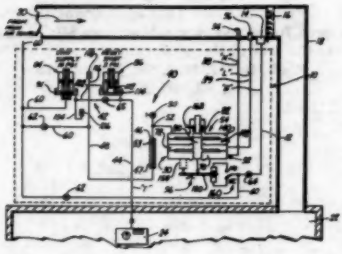
1. A box for use in carrying hot food products with internal stacking capacity and comprising a base, a box sidewall extending upwardly from said base, a top fittable with said box sidewall to close said box and at least one platform outwardly covered by said box sidewall, said platform having downwardly extending spacing means for spacing said platform above said base and below said top when said top is closed for vertical stacking of products in said box, said platform being movably secured to said box for lifting said platform and exposing said base with said platform remaining attached to said box, said box being provided with venting holes through said platform and interiorly of said box and through said box sidewall to the exterior of said box.

4,957,238

PNEUMATIC VARIABLE AIR VOLUME CONTROLLER

Paul E. Kreuter, Goshen, Ind., assignor to Kreuter Mfg. Co., Inc., New Paris, Ind.

Filed Oct. 30, 1989, Ser. No. 428,951
Int. Cl.[5] F24F *13/14*
U.S. Cl. 236—49.4 11 Claims



2. In a pneumatic variable air volume controller for controlling the supply of conditioned air through a pressure to a defined area, the controller including first means for developing a first pneumatic pressure control signal from a pneumatic source. representative of the velocity pressure of air flowing in the passage; second means for developing a second pneumatic pressure control signal from a pneumatic source responsive to the temperature in the defined area; a third means responsive to the differences between said first and second pneumatic pressure control signals for generating a pneumatic pressure output signal for driving a damper actuator to control a damper in said passage to vary the volume of air flow in the passage to tend to balance the first and second pneumatic pressure control signals against each other, the pneumatic pressure output signal resulting from a substantially linear response both to the velocity of the air flow in said passage and to the temperature in said defined area; the improvement wherein:

(a) the first means includes a first pneumatic differential pressure comparator for developing a first pneumatic pressure control signal which varies as the square of the velocity of the air flow in the passage;

(b) the second means includes means for using a pneumatic signal which is a linear representation of the temperature in the defined area for developing the second pneumatic pressure control signal which varies with the area temperature as the square of that temperature;

(c) the third means includes a second differential pressure comparator for comparing these first and second pneumatic pressure control signals to generate a pneumatic pressure output signal representative of the difference between the first and second control signals for controlling a damper actuator to cause a damper to vary the volume of air flow in the passage to tend to cause the first and second pneumatic pressure control signals to come into balance;

(d) the second means includes:

(1) a capillary,

(2) an orifice member provided with a control orifice therethrough,

(3) an intermediate conduit delivering a pneumatic pressure signal which is a linear representation of the temperature in the defined area into a first end of the capillary, and

(4) a thermostat pneumatic pressure signal conduit receiving the resulting pneumatic pressure signal from a sec-

ond end of the capillary and delivering it to a first side of the orifice member for discharge through the orifice into the atmosphere; and

(e) the thermostat pneumatic pressure signal conduit is open to the third means to deliver the pneumatic pressure signal existing between the capillary and the control orifice to the second differential pressure comparator as the second pneumatic pressure control signal.

4,957,239

SPRAY HEAD FOR AN AEROSOL CONTAINER

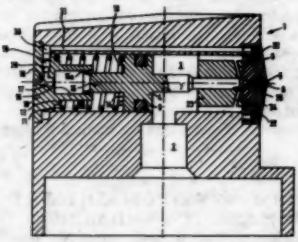
Antonie P. Tempelman, Meeden, Netherlands, assignor to Mobace B.V., Veendam, Netherlands

Filed May 15, 1989, Ser. No. 352,015

Claims priority, application Netherlands, May 16, 1988, 8801260

Int. Cl.[5] **B65D** *83/36*

U.S. Cl. 239—117 **25 Claims**



1. In a spray head for a fluid dispenser, comprising a body having a connecting duct for sealingly receiving a delivery tube stub of an aerosol valve; a spray orifice; a chamber in said body connecting said connecting duct and said spray orifice; a piston member disposed in said chamber and presenting a needle member cooperating with said spray orifice; and spring means urging said piston member to said spray orifice, said spray orifice being sealed by the end of said needle member in an inoperative position, and the piston member being arranged to move against the force exerted by said spring means under the influence of an elevated pressure prevailing in said chamber, whereby the spray orifice is cleared by said needle member, the improvement which comprises that the rear face of the piston member, which faces away from the needle member, defines a wall of at least one substantially closed space which through at least one channel is in communication with at least one point, located in or near the spray orifice, for the injection of air from said closed space into the product stream to be sprayed through said spray orifice.

4,957,240

ROTARY SPRINKLERS

Peretz Rosenberg, Moshav Beit Sharim, Israel

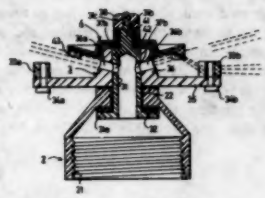
Filed Sep. 26, 1988, Ser. No. 249,018

Claims priority, application Israel, Oct. 1, 1987, 84068

Int. Cl.[5] **B05B** *3/02*

U.S. Cl. 239—233 **19 Claims**

1. A rotary sprinkler including a mounting, a nozzle rotatably mounted thereon and formed with an orifice for discharging a water jet, an impact member carried by said nozzle for periodically receiving impacts effective to rotate the nozzle about its mounting, and a rotary deflector rotatably mounted with respect to said nozzle and having a circular array of a plurality of vanes in the path of the water jet effective to be impinged by the water jet and thereby to rotate the deflector, said deflector having jet-directing means in the path of the water jet at a predetermined angular position of the deflector with respect to the nozzle and effective, when the deflector is in said predetermined angular position, to cause at least a



portion of the water jet to be directed against said impact member to rotate the nozzle about its mounting.

4,957,241

FUEL INJECTION DEVICE WITH AIR CHAMBER

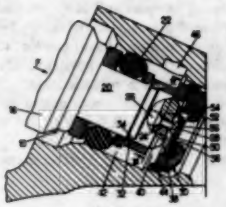
Labouefle Roger, Rueil Malmaison, France, assignor to Solex, France

Filed Aug. 30, 1989, Ser. No. 400,540

Claims priority, application France, Aug. 30, 1988, 88 11376

Int. Cl.[5] **F02M** *61/16*; **F02B** *51/06*

U.S. Cl. 239—409 **4 Claims**



1. Injection device for an internal combustion engine, comprising an electrically controlled injector having a body provided with means for removably connecting said body in a passage opening into an engine induction passage and formed with a nose of reduced diameter and a cap fitted on the nose of the injector, formed with a fuel jet outlet opening, said cap being connected on the nose of the injector in such a position that it defines an air chamber with said nose and is formed with lateral openings communicating the air chamber with a space formed between the cap and the wall of said passage, said space being for connection to an air source,

wherein said injection device further comprises a spacer plate retained between the cap and the nose, formed with a central calibrated hole surrounding an outlet of the injector for constituting a calibrated fuel-air jet outlet passage and wherein said spacer plate is provided with means for retaining it between the nose and the cap in a predetermined position.

4,957,242

FLUID MIXING DEVICE HAVING A CONICAL INLET AND A NONCIRCULAR OUTLET

Klaus C. Schadow; Ephraim Gutmark; Kenneth J. Wilson, and Robert A. Smith, all of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 12, 1988, Ser. No. 180,751

Int. Cl.[5] **B05B** *1/02*

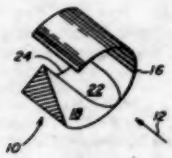
U.S. Cl. 239—590 **15 Claims**

1. A fluid mixing device in which a first fluid flows through the device in a predetermined direction and mixes with a sec-

ond fluid located downstream of the device, the device comprising:

a generally conical section substantially axially aligned with said direction of flow and having a large dimension in substantially a circular orifice through which said first fluid enters, said conical section having an interior surface extending from said circular orifice and converging toward a small dimension of said conical section;

a noncircular section having an interior surface generally parallel to said direction of flow and abruptly intersecting said interior surface of said conical section, said interior surface of said noncircular section extending from said



circular orifice and terminating in a noncircular orifice through which said first fluid exits, said noncircular orifice having an elliptical shape, said elliptical shape having a major axis dimension and a minor axis dimension, said dimensions being unequal and at substantially right angle to each other, said major axis dimension being no greater than said large dimension of said conical section and said minor axis dimension being approximately equal to said small dimension of said conical section;

means between said conical section and said noncircular section for generating axial vortices and azimuthal instabilities; and

said fluid mixing device having a fixed shape.

4,957,243

SHREDDER

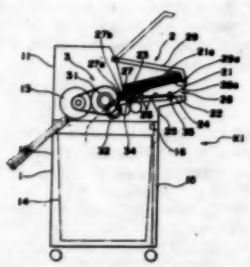
Toshikuni Kanagaki, Nara; Minoru Hashimoto, Yamatokoriyama; Shougo Iwai, Yamatokoriyama, and Masaru Nishijima, Hirakata, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 271,377, Nov. 14, 1988, abandoned, which is a continuation of Ser. No. 047,285, May 8, 1987, abandoned. This application Sep. 5, 1989, Ser. No. 403,897

Claims priority, application Japan, May 8, 1986, 61-105878; Oct. 2, 1986, 61-235980; Oct. 2, 1986, 61-235981; Oct. 2, 1986, 61-235982; Oct. 2, 1986, 61-235983

Int. Cl.[5] B02C *25/00*

U.S. Cl. 241—34 **3 Claims**



1. A shredder for shredding documents, comprising:

cutting means for cutting said documents;

a first document feeding portion for feeding said documents to said cutting means;

a second document feeding portion for feeding said documents to said cutting means;

document transporting means located at said first document feeding portion for transporting said documents to said cutting means;

first document detecting means for detecting the presence of said documents in said first document feeding portion and generating an output signal indicate thereof;

drive means for driving said document transporting means;

second document detecting means for detecting the presence of said documents in said second document feeding portion and generating an output signal indicate thereof; and

drive control means for controlling operation of said drive means in accordance with an output signal generated by said first document detecting means and an output signal generated by said second document detecting means, wherein said drive control means stops said drive means regardless of the output signal generated by said first document detecting means whenever said second document detecting means detects the presence of said documents in said second document feeding portion, and wherein said drive control means controls said drive means in accordance with the output signal generated by said first document detecting means whenever said second document detecting means does not detect the presence of said documents in said second document feeding portion.

4,957,244

BOBBIN WINDING METHOD, AND DEVICES FOR IMPLEMENTING SAID METHOD

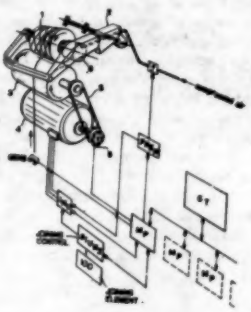
Luigi Colli; Roberto Badiali, and Nereo Marangone, all of Pordenone, Italy, assignors to Savio S.p.A., Pordenone, Italy

Filed Oct. 17, 1988, Ser. No. 258,372

Claims priority, application Italy, Nov. 13, 1987, 22625 A/87

Int. Cl.[5] B65H *54/22*

U.S. Cl. 242—35.6 OR **14 Claims**



1. A method for winding yarn onto a rotating bobbin driven by a drive roller and supported by a carrier arm when the yarn feed is broken, comprising:

(a) restoring the broken yarn feed by means of an intervention cycle wherein said cycle has a first portion and a second portion wherein said first portion comprises the steps of:

(1) raising the rotating bobbin from the drive roller when the yarn feed is broken;

(2) braking the rotating bobbin and the drive roller independently until the bobbin stops rotating wherein the rotating bobbin is braked when it is separated from the drive roller;

and wherein said second portion comprises joining the broken yarn; and

(b) interposing a variable time delay between the commence-

ment of said bobbin braking step of said first portion and the commencement of said joining step of said second portion of said intervention cycle by means of a timer device wherein said variable time delay is determined by the amount of yarn wound on the bobbin, wherein the amount of yarn wound on the bobbin is determined by measuring the revolutions of the drive roller from the commencement of bobbin winding by a counter means.

4,957,245

TEXTILE WINDING MACHINE

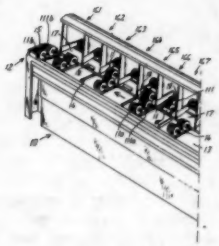
Hermann Spinner, Wetzikon, Switzerland, assignor to W. Schlafhorst & Co., Fed. Rep. of Germany

Continuation-in-part of Ser. No. 190,484, May 5, 1988, abandoned. This application Jun. 28, 1989, Ser. No. 373,149

Claims priority, application Italy, May 6, 1987, 83369 A/87

Int. Cl.[5] B65H *54/20, 67/06*

U.S. Cl. 242—35.5 A **8 Claims**



1. A textile winding machine for producing discrete pairs of cross-wound yarn packages for subsequent simultaneous drawing of the yarn of both packages of each discrete pair of packages during a twisting and doubling operation, the length of yarn drawn from one package of each respective discrete pair of packages being different from the length of yarn drawn from the other package of the respective discrete pair of packages, said textile winding machine comprising:

a plurality of winding stations, each respective winding station producing packages in such a manner that each cross-wound yarn package has a length of yarn different than the length of yarn of the yarn package produced immediately thereafter at the same winding station;

means for conveying packages from said winding stations, said conveying means including means for maintaining discrete pairs of packages separate from other packages during the conveying thereof; and

means for depositing wound pairs of packages from each winding station onto said discrete package pair maintaining means of said conveying means for conveyance by said conveying means as a discrete pair of packages separate from other packages, each deposited pair of packages including a first package produced at a respective winding station and the next package produced at the same respective winding station following the production of said first package.

4,957,246

TOILET ROLL COVER

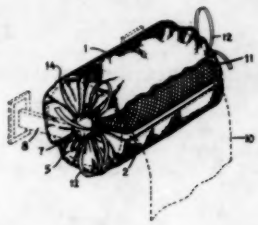
Karen D. Kantor, 64 Peppler St., Unit 32, Waterloo, Ontario, Canada N2J 4P7

Filed Mar. 15, 1990, Ser. No. 493,762

Int. Cl.[5] B65D *85/67*

U.S. Cl. 242—55.53 **4 Claims**

1. A cover for a roll of toilet paper on a toilet paper suspension means, comprising a piece of material formed into a generally cylindrical shape with a longitudinal opening running substantially from one end of said generally cylindrical shape, and drawing and fastening means for pulling the material of said generally cylindrical piece radially inwardly at said ends to form end faces each having an inner circular gap left in both



of said end pieces to accommodate said toilet paper suspension means.

4,957,247

FILM WINDING APPARATUS

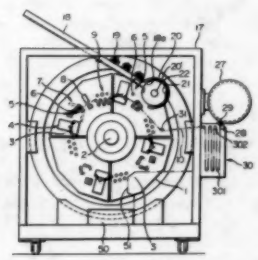
Masao Nakamura, Machida; Norio Sakamoto, Sagamihara, and Takashi Ito, Hachioji, all of Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Nov. 30, 1988, Ser. No. 278,100

Claims priority, application Japan, Dec. 3, 1987, 62-306731

Int. Cl.[5] B65H *18/10, 19/28*

U.S. Cl. 242—67.1 R **4 Claims**



1. A positioning device in a film winding apparatus for positioning a spool of photographic film, the spool having a core and a lateral rib formed on an external circumference of the core, around which a predetermined length of the photographic film is wound, the positioning device comprising:

a spool chuck to hold the spool;

a driving shaft in communication with the spool chuck for rotating the spool;

a backstop means attached to the driving shaft for preventing the driving shaft from rotating;

means for controlling a driving device connected with the driving shaft;

a movable upper chute installed above a path line of the film, the movable upper chute including a stopping device which contacts the rib of the spool to stop rotation of the spool;

means for controlling the stopping device to stop the rotation of the spool at a predetermined position;

a movable lower chute installed below the path line of the film, the lower chute being selectively movable towards the path line of the film until the lower chute touches a lower surface of the upper chute; and

upper and lower nip rollers installed in the vicinity of a film delivery point of the upper and lower chutes, where the upper and lower nip rollers pinch a leading part of the

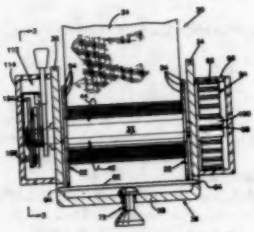
film, move the pinched leading part along the upper chute, and send the pinched leading part of the film to the spool.

4,957,248

SEAT BELT RETRACTOR WITH COMFORT MECHANISM

Utz H. Schmidt, Utica, Mich., assignor to TRW Vehicle Safety Systems Inc., Lyndhurst, Ohio

Filed Feb. 9, 1989, Ser. No. 308,824
Int. Cl.[5] A62B *35/00*; B65H *75/48*
U.S. Cl. 242—107.7 **7 Claims**



1. A vehicle seat belt retractor including a spindle having seat belt webbing wound thereon, said spindle being supported for rotation in belt retraction and withdrawal directions, and means for biasing said spindle to rotate in the belt retraction direction, and further comprising:

a ratchet wheel connected to said spindle for rotation with said spindle;

a plurality of ratchet teeth extending from said ratchet wheel;

a pawl member movable from a first position in which said pawl member is spaced from said ratchet wheel to a second position in which said pawl member engages one of said plurality of ratchet teeth on said ratchet wheel to block rotation of said ratchet wheel and said spindle in the belt retraction direction; and

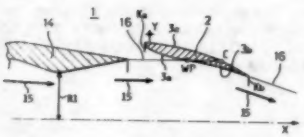
means separate from said ratchet wheel for preventing movement of said pawl member to its second position during rotation of said spindle in the belt retraction direction at a speed above a predetermined speed, comprising a cam member driven by rotation of said spindle, said cam member including a cam surface for engaging said pawl member and propelling said pawl member in a direction toward its first position during rotation of said spindle in the belt retraction direction at a speed greater than the predetermined speed, said cam member being located adjacent said ratchet wheel and rotatable about a common axis with said ratchet wheel, said cam surface including a base surface having a radius greater than the largest radial extent of the crests of said ratchet teeth, a lobe having a radial extent greater than the radius of said base surface and a recess having a radius less than the radial extent of the roots of said ratchet teeth, said pawl member being engageable with said base surface of said cam member intermediate its first and second positions and during rotation of said cam member in the belt retraction direction said pawl member being engageable with said lobe, said lobe being shaped to propel said pawl member toward its first position when said spindle rotates in the belt retraction direction above the predetermined speed and said pawl member entering said recess and moving to its second position when said spindle rotates in the belt retraction direction below the predetermined speed.

4,957,249

THRUST VECTOR CONTROL FLAP WITH A MERGING CONVEX, CONCAVE INNER CONTOUR, FOR JET AIRCRAFT AND METHOD FOR OPERATING THE SAME

Felix Aulehla, Weyarn, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany

Filed Mar. 30, 1989, Ser. No. 331,269
Claims priority, application Fed. Rep. of Germany, Apr. 7, 1988, 3811616
Int. Cl.[5] B64C *29/00*
U.S. Cl. 244—23 D **8 Claims**



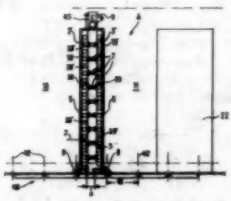
1. A thrust vector control device for jet aircraft, comprising jet nozzle means for producing a propulsion jet, flap means for influencing the flow direction of said propulsion jet, hinge means for hinging said flap means in a position relative to said jet nozzle means for said influencing when said flap means are tilted into said propulsion jet, said flap means comprising a leading edge, a trailing edge, and an inner contour facing said propulsion jet between said leading and trailing edge, said inner contour having a first convex curvature near said leading edge and a second concave curvature near said trailing edge, said first convex curvature merging into said second concave curvature in a transition point, said device further comprising pressure sensor means located for sensing a pressure value dependent on a local pressure head near said inner contour of said flap means to determine a flow edge position of said propulsion jet.

4,957,250

DEVICE FOR INTERCEPTING AND RETAINING OF CARGO IN A TRANSPORT CABIN

Mohammad Hararat-Tehrani, Bremen, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany

Filed Aug. 7, 1989, Ser. No. 390,622
Claims priority, application Fed. Rep. of Germany, Aug. 11, 1988, 3827278
Int. Cl.[5] B64D *1/10*
U.S. Cl. 244—118.1 **10 Claims**



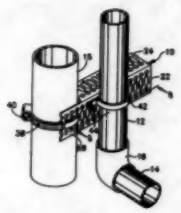
6. A device for separating in a vehicle a space for cargo and for retaining cargo in said space, comprising at least two individual wall sections, mechanical friction energy absorbers responsive to compression loads for taking up impact energy, said friction energy absorbers being arranged between and connected to said individual wall sections, one of said wall sections having a first outer surface suitable to face a cabin in said vehicle, another of said wall sections having a second

outer surface suitable for taking-up impacts, wherein each of said wall sections comprises I-beams, each I-beam having an I-beam web arranged so that the I-beam webs are extending substantially in parallel to an impact direction, and wherein inner chords of said I-beams facing each other are spaced from each other at a spacing in which said energy absorbing elements are arranged.

4,957,251
PIPE SUPPORTING BRACKET

George R. Hubbard, 4425 Caminito Tecera, Del Mar, Calif. 92014

Continuation of Ser. No. 214,761, Jul. 5, 1988, abandoned. This application Aug. 8, 1989, Ser. No. 393,043
Int. Cl.[5] F16L *3/00*
U.S. Cl. 248—68.1 8 Claims



4. A pipe supporting assembly, comprising:

a bracket of square, channels-shaped cross-section having a central web with a pair of side flanges depending from the respective opposite side edges of the central web, the central web being longer than the side edges so that it projects beyond the ends of the side flanges at least at one end of the bracket, each of the end edges of the side flanges adjacent the projecting central web portion being free and uncovered and being inclined at an obtuse angle to the projecting central web portion, and the central web being of uniform width between its opposite side edges along the entire length of the web, the central web and side flanges each having a series of openings extending along their length;

the end of the central web which projects beyond the ends of the side flanges, and the adjacent inclined free ends of the side flanges, together comprising locating means for direct engagement with a supporting member to locate the bracket against the supporting member; and

fastener means for extending through said openings to selectively secure members against the side flanges and central web of the bracket.

4,957,252
SUPPORT FOR PLASTIC BAGS HAVING HANDLES

Vancil W. Watkins, 2058 Lovers La., Shreveport, La. 71105

Filed Jun. 26, 1989, Ser. No. 371,071
Int. Cl.[5] A63B *55/04*
U.S. Cl. 248—97 11 Claims

1. A support for a plastic bag having integral handles, said support comprising a base characterized by a rigid, elongated base member shaped substantially in the configuration of a polygon; a pair of rigid, elongated vertical members upward-standing from fixed attachment to said base in spaced relationship; a rigid, elongated bag retainer shaped substantially in the configuration of a rectangle, said bag retainer fixedly supported by said vertical members in spaced relationship with respect to said base for receiving the plastic bag; and a pair of downwardly-extending cleats carried by said vertical members, respectively, said cleats located between said bag retainer

and said base member for receiving the handles and supporting the plastic bag on said bag retainer.

4,957,253
BABY BOTTLE HOLDER

William C. Roy; Judith A. Roy, both of 1548 D Apache Dr., Chula Vista, Calif. 92010, and Russell C. Edmisson, 329 Poinsettia Ave., Coronado del Mar, Calif. 92625

Continuation-in-part of Ser. No. 209,308, Jun. 21, 1988, abandoned, and a continuation-in-part of Ser. No. 280,250, Dec. 5, 1988, abandoned. This application Oct. 12, 1989, Ser. No. 420,590
Int. Cl.[5] A47D *15/00*
U.S. Cl. 248—104 7 Claims

1. A nursing bottle support for freeing the hands of a infant-carrying person, which comprises:

a bendable, non-resilient hook section formable into an open loop shaped and dimensioned to engage the neck of the person, and a generally straight shank sized to hang against the person's chest;

a resiliently adjustable clasp sized to fit around a nursing bottle; and

a multi-directionally orientable means for attaching the clasp to the shank of the hook;

wherein the clasp comprises a generally ring-shaped element made of elastomeric material, and having an orientable means on its outer periphery for rotatably connecting said element to the shank of the hook; and

wherein said bendable hook section is made from a length of electrical cable comprising,

a core made from a multi-strand metallic conductor; and

a insulating sleeve surrounding the conductor.

4,957,254

UNIVERSAL CONTAINER HOLDER

Johnny L. Hill, 1005 Evergreen, Longview, Tex. 75604, and David E. Gormley, Rt. 1, Box 476, Pocola, Okla. 74902

Filed Oct. 10, 1989, Ser. No. 418,559
Int. Cl.[5] A47G *29/00*
U.S. Cl. 248—207 **6 Claims**

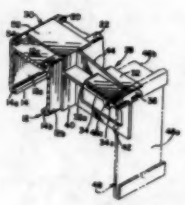
1. A universal container holder for supporting a beverage container from a structure, comprising a clip adapted for mounting on the structure, said clip characterized by a support portion, engaging means carried by said support portion for engaging the structure and a pair of curved legs projecting from said support portion in spaced relationship, said curved legs having an arcuate, concave receiving surface; and a T-bar adapted for engaging said clip and supporting the beverage container in an upright configuration, said T-bar characterized by a bar tab for engaging said arcuate, concave receiving surface of said clip in articulating relationship, a bar neck extending from said bar tab and receptacle means carried by said bar neck for receiving and supporting the beverage container.

4,957,255

VALANCE SUPPORT BRACKET

Julius F. John, Redondo Beach, Calif., assignor to Home Fashions, Inc., Santa Monica, Calif.

Filed Feb. 28, 1989, Ser. No. 316,652
Int. Cl.[5] E06B *9/00*
U.S. Cl. 248—222.3 **10 Claims**



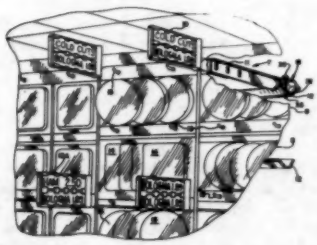
1. A valance support bracket for mounting on a headrail of a venetian blind wherein the headrail has a mounting channel defined by a pair of laterally spaced mutually facing mounting flanges extending longitudinally along an external surface, said valance support bracket comprising a valance support end portion and a headrail mounting end portion, said headrail mounting end portion including a mounting plate having a longitudinal axis and a pair of locking arms defining a pair of generally parallel locking flanges fixed to and spaced from said mounting plate in generally transverse relation thereto, one of said locking flanges having less transverse length than the other locking flange to enable insertion of said locking flanges between the mounting flanges into said mounting channel when the mounting plate is disposed with its longitudinal axis in a first angular orientation of approximately 45° relative to the longitudinal axis of the headrail, said locking arms being further adapted to receive said mounting flanges between said locking flanges and said mounting plate for releasable locking relation with said headrail when the valance support bracket is rotated generally within the plane of said mounting plate to a second orientation wherein the longitudinal axis of said mounting plate is substantially perpendicular to the longitudinal axis of the headrail, said locking flanges having oppositely directed free ends adapted to frictionally engage the headrail when said valance support bracket is in said second orientation, and a wall fixed to said mounting plate at right angles thereto, said wall being adapted to engage a sidewall of the headrail so as to limit rotation of said support bracket during movement to said second orientation.

4,957,256

PRICE TAG DISPLAY HOLDER AND SUPPORT ARM

Mary B. Boeding, Madison, Wis., assignor to Oscar Mayer Foods Corporation, Madison, Wis.

Filed Dec. 4, 1989, Ser. No. 445,000
Int. Cl.[5] A47B *96/00*
U.S. Cl. 248—225.1 **21 Claims**



1. A price tag display holder and support arm device in combination with a peg-bar display system for peggable packages includes, a plurality of horizontal, vertically spaced peg support bars, a plurality of horizontal package support pegs projecting at right angles in cantilever fashion from said support bars with the proximal end of each support peg supportably attached to one of said peg support bars and with peggable packages loaded on and removable from said support pegs,

each said price tag display holder and support arm device comprising, a support arm mounted in cantilever fashion at its proximal end on one of said peg support bars and projecting therefrom at a right angle thereto and extending outwardly therefrom at least to the distal end of the next adjacent of said support pegs, and a price tag display holder mounted on the distal end of said support arm and extending outwardly therefrom,

said peggable packages being loaded on said package support pegs in a plurality of vertically spaced horizontal rows with no appreciable space between the bottoms of said packages in a horizontal row and the tops of said packages in the subjacent horizontal row.

4,957,257

COMPOUND CLAMP WITH ADJUSTABLE PERPENDICULAR CLAMPING COMPONENT

Luis M. Gonzalez, 8710 E. Gregory La., Des Plaines, Ill. 60016

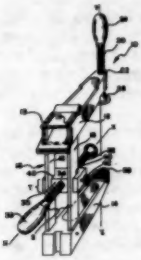
Filed Sep. 28, 1989, Ser. No. 412,857
Int. Cl.[5] A47G *29/02*
U.S. Cl. 248—231.7 **6 Claims**

1. A clamp comprising:

a first clamping component defining a plane and having first clamping means for presenting a clamping force along a first clamping axis in the plane, said first clamping means including a first arm and a second arm defining a plane,

and means for moving said first arm relative to said second arm within said plane;

a second clamping component having a second clamping axis, the second clamping axis being perpendicular to the first clamping axis; and,



means for attaching the second clamping component to the first clamping component so that the second clamping axis is in the plane of the first clamping component and is translationally adjustable along the first clamping axis independent of the clamping means of the first clamping component.

4,957,258

STAND FOR MOTIONABLY MOUNTING ADVERTISEMENTS

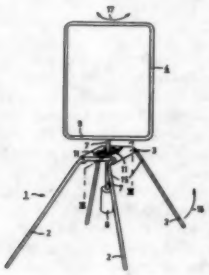
Roman Tiedemann, Vienna, Austria, assignor to Esselte Pendaflex Gesellschaft m.b.H., Vienna, Austria

Filed Apr. 24, 1987, Ser. No. 42,062

Claims priority, application Fed. Rep. of Germany, Apr. 25, 1986, 8611481

Int. Cl.[5] E04G *3/00*

U.S. Cl. 248—292.1 **26 Claims**



1. A stand for motionably mounting advertisements such as placards or signs comprising a foot-structure to be placed on the ground and a mount receiving the advertisement and displaceably connected to the foot-structure, wherein the mount for the advertisements rests on the foot-structure by means of a pendulum bearing support having an approximately horizontal swing axis, and wherein a pendulum weight is attached to the mount or to the advertisement below the swing axis of the pendulum bearing such that said pendulum weight tends to return the advertisement to a rest position when external forces are not present, said stand further including bias return means for exerting a return force toward said rest position only after a predetermined magnitude of movement away from said rest position has been exceeded.

4,957,259

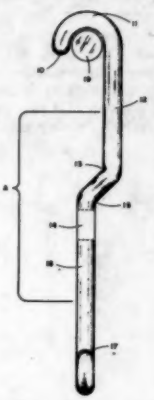
DOUBLE HOOKED UTILITY HANGER, WITH HANGER SUSPENSION HOLE

Edward J. Wolf, Jr., 4204 242nd St., SW, Mountlake Terrace, Wash. 98043

Filed Feb. 17, 1989, Ser. No. 311,869

Int. Cl.[5] F16B *45/00*

U.S. Cl. 248—304 **4 Claims**



1. A hooked means for the suspension of a multiplicity of objects requiring a single attachment to a support comprising:

a. a vertically extending connecting shaft;

b. a top hooked attachment end extending from said connecting shaft;

c. an offset immediately below top hooked attachment end of said connecting shaft positioned so as to align said connecting shaft and suspended load beneath attachment point;

d. a bottom hooked suspension end extending from said connecting shaft and rotated on a 90 degree aspect from said top attachment end;

e. a suspension hole centrally located along said connecting shaft, below the top attachment end offset, for the purpose of suspending added members of the present invention to form a vertical series of suspension points; and

f. an offset in said connecting shaft beneath the suspension hole, so as to position the suspension end foward of the top attachment end of any subsequent member of the series suspended from the suspension hole in said connecting shaft.

4,957,260

UNITARY MOUNTING BRACKET FOR PRESSURIZED CONTAINERS

William F. Shelley, 14 Logwood Cir., Essex Junction, Vt. 05452

Filed Aug. 16, 1989, Ser. No. 394,712

Int. Cl.[5] A47K *5/00*

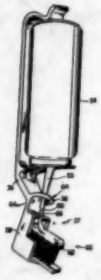
U.S. Cl. 248—311.3 **6 Claims**

1. A unitary mounting bracket for a gas-pressurized canister comprising a paste to be dispensed onto an elongated object, having at its top end an elongated nipple actuator extending along the longitudinal axis of the canister, wherein movement of the actuator from the axis causes the paste to be dispensed from the tip of the actuator, and at its other end a base having a circular ridge, said bracket comprising:

an elongated base having at least one planar surface adapted for fixation to a flat surface, said base extending along a first longitudinal axis and having at one end portion of said first longitudinal axis a spring portion constructed and arranged to mate with the circular ridge of the canister

base, and at another end portion of said first longitudinal axis a pair of arms extending approximately perpendicular to said first longitudinal axis, said arms being spaced apart along said base a distance sufficient to allow the nipple actuator to pass therebetween while said arms support the top end of the canister, wherein said arms cooperate with said spring portion to fixedly hold the canister between said arms and said spring portion, along a second longitudinal axis parallel said first longitudinal axis, and wherein the canister can be readily removed and replaced from between said arms and said spring portion;

a ring portion fixedly connected by a flexible arm to said base at a point below said arms, said ring portion defining an aperture disposed along said second longitudinal axis, said flexible arm extending at an acute angle from said base below said arms to said ring portion; wherein said nipple actuator extends through said aperture of said ring



portion along said second longitudinal axis when the canister is fixedly positioned in said base, said nipple actuator being near or adjacent a part of said ring portion positioned furthest from said first longitudinal axis, wherein said flexible arm is constructed and arranged to allow movement of said ring portion in a direction from said second longitudinal axis to said first longitudinal axis and to allow said part of said ring portion to contact and move said nipple actuator and thereby cause paste to be dispensed from the tip of the actuator;

and a wall fixedly connected to said flexible arm below said ring portion and extending in a direction parallel to and spaced from said first longitudinal axis, said wall being constructed and arranged to allow the elongated object to contact and move said wall in said direction from said second longitudinal axis to said first longitudinal axis and thereby cause said ring portion to be moved in said direction to cause dispensing of the paste.

4,957,261

COPYHOLDER/ORGANIZER

Salvatore Cirami, 12-21 35th Ave., Apt. 4F, Long Island City, N.Y. 11106

Continuation-in-part of Ser. No. 68,460, Jul. 1, 1987, abandoned. This application Jun. 16, 1989, Ser. No. 367,438

Int. Cl.[5] A47G 1/24

U.S. Cl. 248—454 **14 Claims**

1. For placement alongside a typewriter or desktop personal computer to support a multipage document existing on a given standard size of typewriter paper having a given width and given length and comprising loose pages having a given collation which are marked for revision and are to be set aside sequentially as revisions are completed:

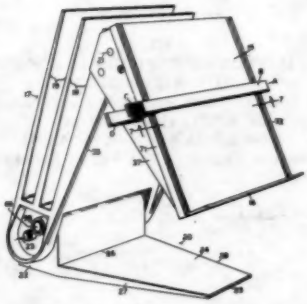
a typist's copyholder/organizer proportioned for said placement and use with said given standard size of typewriter paper and providing means for storing set aside pages in a manner that retains their collation; comprising:

a rearwardly inclined copyboard having upper and lower ends and a shelf projecting forwardly from its lower end for support of a given number of said loose pages; said copyboard having a given length as measured from its extreme upper end to said shelf at least equal to the length of said paper;

a forwardly inclined storage unit provided behind said copyboard for containment of set aside pages; said storage unit having upper and lower ends and comprising a floor member and first and second panels; said panels having upper and lower ends and forward and rearward sides, being spaced apart as hereinafter recited and having their lower ends fixed to said floor member, said floor member being flat and intersecting said first panel substantially perpendicularly;

the space effectively enclosed between said panels and floor member defining a storage compartment having an open top and laterally opposed open sides, to allow pages to be quickly dropped into said compartment utilizing its open top in combination with either one of its open sides, and pages to be removed by sliding them laterally out of said compartment through either one of its opposed open sides, in each mode of use said storage unit thereby providing left-handed/right-handed user convenience;

means effecting a cooperative relationship between said storage unit as defined above and said copyboard as defined above, such that as a natural consequence of pages being removed from said copyboard with the text side



facing the typist each page dropped into said compartment necessarily comes to rest leaning face down toward the inboard side of said first panel, comprising, the upper end of said copyboard being secured to the upper end of said first panel so they converge like opposed sides of a pyramid and said storage unit as a whole is thereby forwardly inclined;

means preventing interference between the top edge of any page stored in said compartment and the top edge of any page resting on said copyboard, comprising, said first panel having a given length as measured from its extreme upper end to said floor member at least equal to the length of said paper;

means providing a strike surface toward which the typist aims the lower edge of each page being set aside so as to cause each page necessarily to enter said compartment behind the last stored page, comprising:

said panels being spaced apart at their lower ends a given distance great enough for said compartment to receive said given number of pages with sufficient clearance remaining between the last of said pages and the forward side of said second panel for such last page to fall freely to said floor member;

said panels being spaced apart at their upper ends a distance at least equal to the distance which said panels are spaced apart at their lower ends;

as a consequence of the forward inclination of said storage unit, said floor member being inclined downwardly

toward said first panel and thereby causing the bottom edge of set aside pages to tend to slide toward said first panel and thereby maintain said clearance;

means providing set aside pages quickly removable through one of the opposed open sides of said compartment by tapping them out from the opposite open side, comprising, said first panel having a width at least a portion of which is less than the width of said paper.

4,957,262

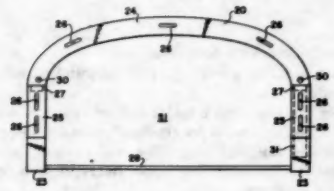
SPACE DEFINER FOR USE ON HORIZONTAL SURFACES

Alicia W. Kemper, Tallahassee, Fla., assignor to Innovec, Inc., Tallahassee, Fla.

Filed Aug. 5, 1988, Ser. No. 228,943

Int. Cl.[5] A47B *47/04*

U.S. Cl. 248—460 **27 Claims**



1. A space definer comprising a wall with two free ends and adapted to lie on a generally horizontal flat supporting surface to define an enclosed activity area open on one side thereof facing a user, said wall including a forward wall portion and two side wall portions connected to each other to form said wall in a generally U-form, said U-form wall having an inwardly facing surface and an outwardly facing surface, at least one of said wall portions having a storage space located between said wall surfaces for accessories to be used with said space definer.

4,957,263

UNIVERSAL CUP AND SAUCER DISPLAY

Sidney J. Leluan, Jr., 3130 E. Seneca, Tucson, Ariz. 85716

Filed Nov. 21, 1988, Ser. No. 274,360

Int. Cl.[5] A47B *97/04*

U.S. Cl. 248—473 **12 Claims**

1. A universal cup and saucer display for holding a cup and saucer each singularly, and together, in a prominent display position comprising:

a pair of spaced apart parallel elongated legs;

a plurality of cross members operably attached between said spaced apart elongated legs;

a pivotal back rest operably connected to said pair of spaced apart elongated legs, said back rest adapted to support the saucer in a prominent display position; and

a removable cup insert plate situated between said pair of spaced apart legs, said cup insert plate defining a thin flat plate having an opening therethrough adapted to support a cup in said opening for prominent display whereby the cup and saucer may be simultaneously displayed, or the cup insert plate may be removed to display a saucer separately.

4,957,264

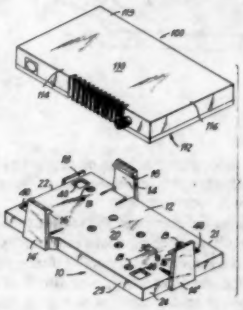
MOUNTING BASE FOR A TELEPHONE DEVICE, SUCH AS A MOBILE TELEPHONE

Pekka Hakanen, Turku, Finland, assignor to Nokia-Mobira Oy

Filed Feb. 8, 1989, Ser. No. 308,246

Int. Cl.[5] F16M *97/00*

U.S. Cl. 248—510 **6 Claims**



1. Mounting base for a telephone device, particularly the transceiver of a mobile telephone, the transceiver having a rigid box-like enclosure, wherein the mounting base comprises a baseboard having a main surface and at least three resilient brackets extending from three sides of the baseboard and substantially perpendicular to the main surface of the baseboard, the brackets having clips at their free ends pointing inwardly over the baseboard, said brackets having a length between said main surface and said clips corresponding to thickness of said telephone device, a retainer extending from the baseboard above the main surface at the fourth side, for mounting, three sides of the transceiver enclosure are placed against the brackets with the transceiver bottom plate against the baseboard so, the bracket clips tightly snapping over the transceiver upper edges and the retainer abutting the edge on the fourth side of the transceiver.

4,957,265

FOLDABLE OUTSIDE REAR-VIEW MIRROR FOR VEHICLES

Edwin Seitz, Neuenbuch, Fed. Rep. of Germany, assignor to Hohe KG, Kommanditgesellschaft, Fed. Rep. of Germany

Filed Dec. 19, 1988, Ser. No. 286,143

Claims priority, application Fed. Rep. of Germany, Dec. 18, 1987, 8716720[U] Nov. 15, 1988, 8814288[U]

Int. Cl.[5] B60R *1/06*

U.S. Cl. 248—549 **12 Claims**

1. An outside rear-view mirror for a vehicle, said mirror comprising:

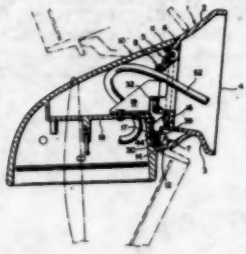
a mirror base;

a mirror housing adapted to assume a normal position for use and to be released from the normal position for use and

rock forwardly and rearwardly relative to said mirror base depending upon a direction of impact on said mirror housing and remain in the forward or rearward position relative to the normal use position until the mirror housing is manually returned to the normal use position, said mirror housing being coupled to said mirror base by a rocker,

said rocker having one end mounted rotatably to the mirror base and having an opposite end mounted rotatably to said mirror housing,

spreading means for biasing said mirror housing to a fully rearward tilted position relative to said mirror base when said mirror housing is caused to tilt rearwardly from its normal position for use,



locking means including at least one locking element caught in a trap for releasably clamping said mirror housing in its normal position for use, and

clamping means for clamping the rocker to said mirror base when said mirror housing rocks rearwardly by the bias of said spreading means, a gripping force of said locking means being less than a gripping force of said clamping means wherein said means for clamping being adapted to release a portion of said rocker when the mirror housing rocks forwardly for allowing the rocker to follow said mirror housing.

4,957,266

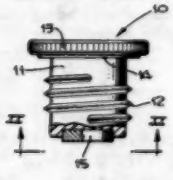
MAGNETIZED GAS CAP

John E. Ellis, 4144½ Normal Ave., Los Angeles, Calif. 90029

Filed Sep. 5, 1989, Ser. No. 402,915

Int. Cl.[5] A47G *1/17*

U.S. Cl. 248—683 1 Claim



1. A gas cap for closing off the filling tube of a vehicle having a screw threaded hollow cylindrical main body portion closed off at the top by a flange of an outer diameter greater than the outer diameter of said main portion, the improvement which comprises:

magnetic means associated said cap for magnetically adhering to a metallic part of the body of the vehicle, said magnetic means including an insert of magnetic material fixedly mounted in the end of said main body portion opposite the end having said flange thereon.

4,957,267

SEAT SLIDE DEVICE

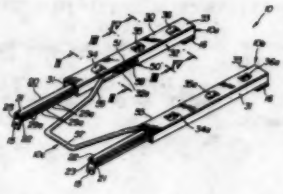
Masanori Terai, Kanagawa, Japan, assignor to Ikeda Bussan Co., Ltd., Ayase, Japan

Filed Mar. 8, 1989, Ser. No. 320,495

Claims priority, application Japan, Jul. 28, 1988, 63-100556[U]

Int. Cl.[5] F16M *13/00*

U.S. Cl. 248—430 16 Claims



1. A seat slide device comprising:

a lower rail including a channel portion with first and second side walls;

an upper rail including a major flat wall portion with first and second side walls longitudinally slidably disposed on said lower rail, said major flat wall portion facing said channel portion when said upper rail is properly disposed on said lower rail; and

first and second lugs integrally formed with and projecting from said major flat wall portion of said upper rail into said channel portion of said lower rail, said first and second lugs being in contact with said inner surfaces of said first and second side walls of said lower rail, respectively, wherein each lug is shaped like a plate including a major surface, said major surface facing generally parallel the inner surface of said corresponding side wall of said lower rail for guiding said upper rail in relation to said lower rail.

4,957,268

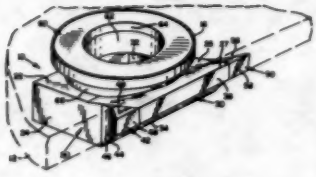
DISPOSABLE CURB INLET DRAIN FORM

August J. Picollo, 628 Beebe Rd., Central Point, Oreg. 97501, and Alfred N. Guillemette, 560 13th St., Gold Hill, Oreg. 97525

Continuation of Ser. No. 56,867, Jun. 1, 1987, abandoned. This application Nov. 30, 1988, Ser. No. 282,963

Int. Cl.[5] E02D *29/12*; B28B *7/34*

U.S. Cl. 249—10 10 Claims



1. A drain form for forming a curb inlet drain having a main body, comprising:

a base means for forming the main body of the curb inlet drain, including inlet opening formation means for forming a drain inlet opening, wherein the inlet opening formation means includes a front portion having a flat front face and sidewalls sloped inwardly from the front face; and

a neck means for forming a manhole opening, the neck means projecting upwardly from the base means;

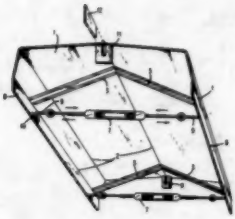
wherein the base means is made of a frangible material capable of being broken into pieces and removed from the drain after curb inlet drain formation, and wherein the front portion comprises a pair of separate wing portions mounted to the base means to provide the inwardly sloped sidewalls.

4,957,269

RECOVERABLE SELF-SUPPORTABLE CRIBWORK FOR SLABS ON PREFABRICATED BEAMS

Jose J. N. Villarreal, Moctezuma #82-E Col. El Carmen, Coyapacan, D.F. c.p. 04100, Mexico

Filed Oct. 6, 1988, Ser. No. 254,235
Claims priority, application Mexico, Oct. 13, 1987, 138381
Int. Cl.[5] E04G *11/42*
U.S. Cl. 249—24 **5 Claims**



1. A recoverable self-supporting mold assembly for pouring concrete slabs on spaced parallel beams, comprising:

a mold panel comprising sheet material formed to have a generally planar central panel portion having side wall portions depending therefrom generally normal thereto, said side wall portions being spaced and generally parallel to be received between adjacent parallel beams;

mold panel support means disposed on and supported by said beams for receiving and supporting said wall portions;

said mold panel having spaced substantially parallel stiffening bends therein; and

removably tensioning means extending between said wall portions for adjusting the spacing between adjacent wall portions,

wherein said mold panel support means comprise a plurality of elongate metal straps having a generally inverted U-shape shaped and sized to fit closely over said beams with arms of said U-shape depending downwards on opposite side of a corresponding beam, said arms having at their extremities initially reverse-bent portions forming generally U-shaped receptables for supporting edges of said wall portions, said reverse-bent portions being disposed to be accessible to be forcibly bent downwards following setting of concrete formed over said mold panel for thereby permitting removal of said mold panels following application of said tensioning means to reduce said spacing between said adjacent wall portions of said mold panels.

4,957,270

CONCRETE COLUMN FORMING TUBE

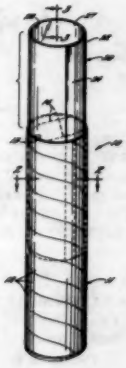
Tony F. Rummage; John T. Wise; Charles D. Foehrenbach, and McCleery B. Cunningham, all of Hartsville, S.C., assignors to Sonoco Products Company, Hartsville, S.C.

Filed Jan. 5, 1989, Ser. No. 294,101
Int. Cl.[5] E04G *13/02*
U.S. Cl. 249—48 **6 Claims**

1. A concrete column forming tube for receiving poured concrete therein to produce a concrete column and characterized by producing surface characteristics on the concrete column including a paper fiber matte finish without seam lines of the forming tube; said forming tube comprising:

an elongate rigid cylindrical tube capable of receiving concrete therein to form a column and comprising partially-overlapped spirally-wound plies of paper adhered together and defining an inside wall surface having spiral seam lines thereon; and

a separately formed flexible cylindrical liner positioned inside said rigid tube in a generally friction-fit relationship and comprising a generally rectangular layer of paperboard material closed on itself with its longitudinal edges abuttingly arranged and defining a seam, and a sealing tape positioned on the outside of said paperboard layer along said seam for maintaining the paperboard layer in



tubular form, said paperboard layer having an inside wall surface of desired paper fiber matt texture and a thickness sufficient to bridge and cover said spiral seam lines on said inside wall surface of said rigid tube to prevent the formation of seam lines on the outside surface of the produced concrete column, and a thin plastic coating layer laminated to said inside wall surface of said paperboard layer to provide a moisture-impervious inside wall surface for said forming tube and having a thickness sufficiently thinner than said paperboard layer so that said plastic coating layer assumes the desired paper fiber matt texture of said inside wall surface of said paperboard layer to produce a concrete column with a paper fiber matt finish on the outside surface.

4,957,271

CONTAINER FOR MEAT MOLDING

Donald L. Summers, 94 Hesterman Dr., and David J. Summers, 2003 Cardinal, both of, Glendale Heights, Ill. 60139

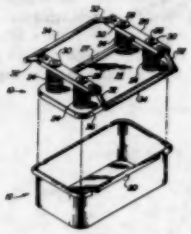
Continuation-in-part of Ser. No. 170,794, Mar. 21, 1988, abandoned. This application Jun. 5, 1989, Ser. No. 361,441
Int. Cl.[5] A47J *27/08*; B29C *43/54*; A23P *1/10*
U.S. Cl. 249—82 **5 Claims**

1. A mold apparatus for shaping meats having an open interior for the containment of said meat that is free from elements of said mold apparatus, said apparatus comprising:

a rectangular mold having a pair of long and a pair of short, substantially vertical, opposing side walls and an open top;

a cover assembly having a lid for telescopic insertion into said mold, at least three springs in contact with said lid at at least three discrete and non-colinear points, at least one attachment bar in contact with said springs at the ends of said springs opposite said lid, means for guiding said lid with respect to said attachment bar and a pair of inflexible and nonadjustable stops for preventing outward movement of the attachment bar with respect to said mold, each

of said stops including a single support rod hinged to said attachment bar for engagement and disengagement with one sidewall of said pair of long opposing side walls, at least one of said support rods comprising an elongated support rod having a length equal to at least half the dimension of the sidewall engaged by said elongated support rod; and,



a lip on one of said long opposing side walls arranged to engage said elongated support rod and provide an extended line of rigid support over the length of said elongated support rod to prevent relative upward movement and rotation of said attachment bar said lip being provided with slot means to engagably receive one of said stops.

4,957,272

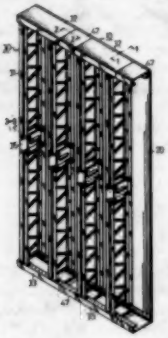
MODULAR CONCRETE FORM

Yuan-Ho Lee, No. 851, Chung-San Rd., Nan-Pao Tsun, Kuei-Jen Hsian, Tainan Hsieng, Taiwan

Filed Jun. 23, 1989, Ser. No. 370,757

Int. Cl.[5] E04G *9/02, 17/14*

U.S. Cl. 249—196 **5 Claims**



1. A form assembly comprising:

form plates arranged in edge-to-edge contiguity, each of said plates having a pair of longitudinal sides and a pair of transverse sides;

a fastening means provided along said longitudinal sides to fasten releasably said form plates;

reinforcement channel pieces attached detachably to said form plates along said transverse sides; and

trussed backing members extending longitudinally between said channel pieces, each of said trussed backing members having two opposite joint ends, said joint ends being detachably connected to said channel pieces, wherein each of said channel pieces includes a plate member, two opposite longitudinal backward flanges extending from two opposite sides of said plate member of said channel piece, one of said opposite longitudinal backward flanges abutting with said form plate for connection thereto, two opposite inward flanges respectively extending from said backward flanges and defining threaded holes therein, and opposite transverse backward flanges extending from said plate member of said channel pieces between said longitudinal backward flanges.

4,957,273

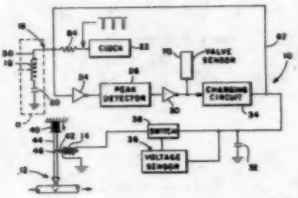
REMOTE SHUT-OFF VALVE

Lawrence M. Sears, 3263 Glencairn Rd., Shaker Hts., Ohio 44122

Continuation-in-part of Ser. No. 935,963, Nov. 28, 1986, Pat. No. 4,779,839. This application Apr. 25, 1988, Ser. No. 185,455

Int. Cl.[5] F16K *31/02*

U.S. Cl. 251—129.04 **32 Claims**



1. A system for actuating an electrical valve from a remote location comprising:

portable means for generating a first electromagnetic signal indicative of a desire to actuate said electrical valve from a remote location;

nonportable means for receiving said first electromagnetic signal from a remote location; and

means for actuating said electrical valve upon the receipt of said first electromagnetic signal, said means for generating said first electromagnetic signal comprises a first portable oscillator and a first portable coil, said first portable oscillator operable to cause alternating current to flow in said first portable coil, said nonportable means for receiving said first electromagnetic signal comprising a supervisory circuit and wherein said nonportable supervisory circuit comprises a nonportable second coil and a capacitor having first and second plates, said first plate of said capacitor electrically communicating with said second coil, said second plate of said capacitor electrically communicating with ground.

4,957,274

POSITION SENSOR FOR A ROTARY VALVE

James A. Hood, Concord, and Paul A. Kirkpatrick, Charlotte, both of N.C., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Dec. 26, 1989, Ser. No. 457,131

Int. Cl.[5] F16K *31/04*

U.S. Cl. 251—129.12 **26 Claims**

1. A system to determine a position of a rotary valve comprising:

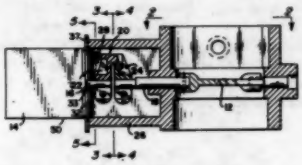
a stepper motor means for supplying power to open and close the rotary valve;

a coupling means for transmitting stepper motor power to the rotary valve;

a sensor actuator affixed to the coupling means; and

at least one limit sensor means for determining the position

of the rotary valve by sensing the position of the sensor actuator, wherein there is no contact between the sensor



actuator and the limit sensor when the position of the rotary valve is being determined.

4,957,275

CONTROL VALVE

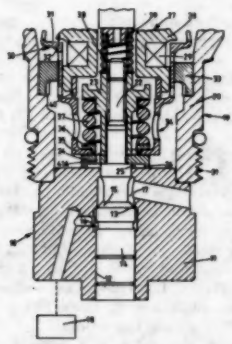
Graham D. Homes, London, England, assignor to Lucas Industries Public Limited Company, Birmingham, England

Filed Dec. 9, 1988, Ser. No. 282,051

Claims priority, application United Kingdom, Dec. 12, 1987, 8729087

Int. Cl.[5] F16K *31/06*

U.S. Cl. 251—129.02 **5 Claims**



1. An electromagnetically operable spill control valve comprising a valve member slidable in a bore in a valve body, a seating in said bore, said valve member being shaped for cooperation with said seating, inlet and outlet chambers defined on opposite sides of said seating, an armature coupled to said valve member, said armature forming part of an electromagnetic actuator, which when energized draws said valve member into engagement with said seating to prevent fluid flow between said inlet and outlet chambers, resilient means acting to oppose the movement of said armature, stop means for determining the extent of movement of said valve member away from said seating under the action of said resilient means when said actuator is de-energized, an annular element disposed adjacent said valve body, an annular rim defined on said annular element, and damping means having an annular recess defined between said annular element and said valve body, said annular element having a restricted opening communicating with said recess, said annular element moving towards said valve body when said actuator is de-energized, said damping means acting to control said movement of said valve member, whereby valve member bounce is minimized.

4,957,276

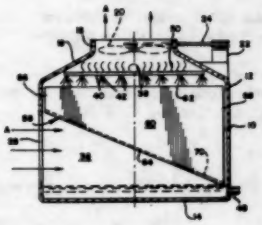
TRAPEZOIDAL FILL SHEET FOR LOW SILHOUETTE COOLING TOWER

Bryan F. Garrish, Ellicott City, Md., assignor to Baltimore Aircoil Company, Jessup, Md.

Division of Ser. No. 158,603, Feb. 22, 1988, Pat. No. 4,873,028. This application Aug. 24, 1989, Ser. No. 397,900

Int. Cl.[5] B01F *3/04*; F28C *1/02*

U.S. Cl. 261—112.100 **2 Claims**



1. An improved substantially flat fill sheet for a cooling tower, said fill sheet comprising:

a trapezoidal face portion extending between two nonparallel edges and unequal opposite sides connected between said edges; said face portion terminating at said edges and said sides, said face portion having a surface with contours defining pathways for a fluid and said face portion including spacer projections on its said surface.

4,957,277

TUBULAR ELASTOMERIC SPRING HAVING CONTROLLABLE BREAKOVER AND SPRING RATE

H. N. Paton, 1218 Third Ave., Suite 1018, Seattle, Wash. 98121

Continuation of Ser. No. 304,886, Jan. 31, 1989, abandoned, which is a continuation of Ser. No. 61,481, Jun. 15, 1987, abandoned. This application Jan. 26, 1990, Ser. No. 471,040

Int. Cl.[5] F16F *3/10*

U.S. Cl. 267—33 **16 Claims**

1. A spring, comprising: an elastomeric tube having a wall sufficient to enable said tube to be deflected by an axial load as a free-standing column and a coil spring embedded in said tube wall and extending along the length of said tube; said tube comprising first and second traverse portions, through each of which extends a generally cylindrical inner bore, said first portion having a generally straight outer profile; and the outer surface of said second portion being provided with an annular groove, the length of which spans at least two adjacent coils of said coil spring, said annular groove being positioned along the length of said tube between one end and the mid-point thereof and at least a portion of the width of said groove having a substantially constant outside diameter less than the outside diameter of said first portion; at least said second portion being unconfined and said annular groove being so-shaped that the middle portion of said second portion bulges outwardly more than the rest of said tube, while remaining out of contact with

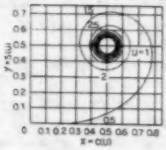
the rest of said tube, until said second portion buckles, without causing said tube as a whole to undergo columnar buckling, in response to a certain axial load on said tube; said tube having a load versus deflection curve which breaks over from a constant rate into a plateau region essentially simultaneously with said second portion buckling and then to a rising rate; said breakover being controllable in accordance with the shape of said second portion.

4,957,278

COIL SPRING

Syoichi Komura, and Hiroyuki Toyofuku, both of Kyoto, Japan, assignors to Sanko Senzai Kogyo Kabushiki Kaisha, Kyoto, Japan

Filed Apr. 12, 1989, Ser. No. 336,476
Claims priority, application Japan, Jan. 10, 1989, 1-4095
Int. Cl.[5] F16F *1/10*
U.S. Cl. 267—166 **2 Claims**



1. A coil spring, comprising:

a strand having a width w and a thickness t, such that $1.1 \leq c \leq 1.7$, where c is a ratio determined according to $c = w/t$,

wherein said strand has a cross-sectional shape defined by a plurality of partial curves, which are portions of a clothoid, as a curve whose radius varies inversely in proportion to its length, and

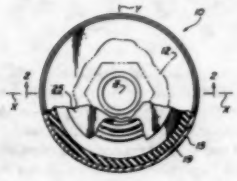
wherein said partial curves are combined to form a closed loop.

4,957,279

FLUIDLESS MULTI-DIRECTIONAL MOTION-DAMPING MOUNT

Richard P. Thorn, Erie, Pa., assignor to Lord Corporation, Erie, Pa.

Filed Jul. 18, 1989, Ser. No. 381,617
Int. Cl.[5] F16F *3/08*
U.S. Cl. 267—140.5 **19 Claims**



1. A mount for damping motion in at least two directions, comprising:

a first member adapted to be connected to a first object,

a second member adapted to be connected to a second object,

a resilient element interposed between the members and mounting the first member for translation in a first direction alongside and relative to the second member and for motion in a second direction lateral to said first direction,

means providing a first resiliently deformable layer extending along said first direction,

means providing a second resiliently deformable layer extending along said second direction, and

means providing a rigid rib engaging both said first and said second resilient layers for slidably deforming said layers in response to motion of said first member relative to said second member in either or both of said directions,

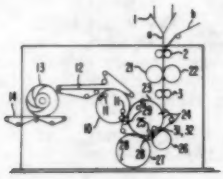
whereby relative motion between the members can be damped in one or more directions.

4,957,280

UNIFORM SPEED PINLESS FOLDING MACHINE

Mikio Motooka, Mihara, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 5, 1989, Ser. No. 293,831
Claims priority, application Japan, Jan. 11, 1988, 63-2433
Int. Cl.[5] B42C *1/04*
U.S. Cl. 270—47 **8 Claims**



1. An apparatus for cutting into successive sheets at least one web of material supplied at a speed of movement, said apparatus comprising:

first cutter means for receiving the web and for cutting across a portion only of the width thereof at a cutting position at which a sheet is to be formed by being cut from the sheet;

a first drum positioned downstream of said first cutter means relative to the direction of movement of the web and adapted to receive the web about a portion of its periphery, said first drum having inwardly of said periphery thereof means for clamping the leading end of the web;

conveyor belt means cooperating with said first drum for pressing against said portion of said periphery thereof only that portion of the width of the web cut by said first cutter means, said conveyor means traveling at the same speed as the peripheral speed of said first drum;

means for pushing the leading end of the web into said first drum, whereupon said clamping means grips the leading end of the web; and

second cutter means, positioned upstream of said pushing means relative to the direction of movement of the web, for cutting at the cutting position of the web that portion of the web not cut by said first cutting means, and thereby for forming a cut sheet separated from the web.

4,957,281

ROTATOR CUFF THERAPEUTIC EXERCISE APPARATUS

Max D. Christolear, Jr., Dayton, Ohio, assignor to Wright State University, Dayton, Ohio

Filed Jan. 30, 1989, Ser. No. 303,139
Int. Cl.[5] A63B *21/06*
U.S. Cl. 272—117 **16 Claims**

1. A therapeutic exercise apparatus, comprising:

a frame;

at least one weight supported on said frame for movement along a working stroke from a rest position against gravitational force to a displaced position;

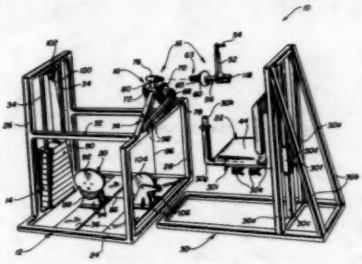
an actuator mechanism mounted on said frame and adapted

to be gripped and rotated by a hand of a user, said actuator mechanism being positioned in either a first or second operating configurations for permitting a corresponding rotational working motion of the one of the user's arm whose hand grips said mechanism;

means coupled to said frame and interconnecting said actuator mechanism and said weight for transmitting rotational motion of the arm of the user to said weight to move said weight along its working stroke;

said motion transmitting means including a two-piece cam assembly with replaceable cams for permitting progressive comparative resistance exercising tailored to particular exercises;

said cam assembly including a rotatable member mounted in said frame and having a central axis and a peripheral portion, a first elongated flexible motion transmitting member interconnected at one end to said actuator mechanism and attached at the other end to a location on said peripheral portion of said rotatable member such that as



said rotatable member is rotated in one or the other of clockwise and counterclockwise directions by rotation of said actuator mechanism said first flexible motion transmitting member adjacent said other end thereof will wrap about or unwrap from said peripheral portion of said rotatable member, a second elongated flexible motion transmitting member interconnected at one end to said weight, extending to said rotatable member and attached at the other end to the periphery of said rotatable member, and a contour cam member having an eccentrically-configured peripheral portion and being removably mountable on said rotatable member at said one side thereof and disposed about said central axis thereof such that as said rotatable member is rotated in one or the other of clockwise and counterclockwise directions by rotation of said actuator mechanism said second flexible motion transmitting member adjacent said other end thereof will wrap about or unwrap from said peripheral portion of said cam member.

4,957,282

GYRO-CYCLE

Timothy A. Wakefield, 2294 St. Rt. 286, Williamsburg, Ohio 45176

Filed Jul. 17, 1989, Ser. No. 380,503

Int. Cl.[5] A63B *21/00*

U.S. Cl. 272—73 **18 Claims**

1. An apparatus for exercising the limbs and torso of a user by resisting precessional torque generated by the apparatus, comprising:

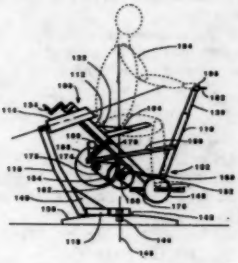
a base;

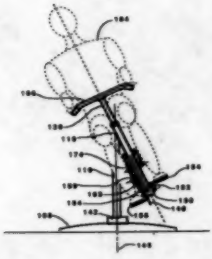
a frame, rotatably coupled to said base for rotation about said base;

a support member for supporting a user, rotatably coupled to said frame for rotation about the longitudinal axis of said support member;

a mass, affixed to said support member, capable of rotation about a spin axis;

and crankshaft means operated by said user affixed to said support member, for rotating said mass,





whereby any rotation of said support member causes rotation of said frame about said base due to the precessional torque generated by said rotating mass.

4,957,283

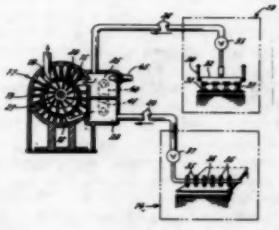
VACUUM SYSTEM FOR FEEDING SHEETS

William J. Kist, Barrington, Ill., assignor to Combined Fluid Products Co., Lake Zurich, Ill.

Filed Oct. 7, 1988, Ser. No. 255,550

Int. Cl.[5] B65H *3/08*; F16D *31/02*; F04B *49/08*

U.S. Cl. 271—90 **16 Claims**



16. A pneumatic system for a printing press comprising

a pump having a primary suction port, a secondary suction port, and a discharge port,

said pump being operable for generating vacuum pressures at said primary and secondary suction ports,

first vacuum operated means including a vacuum operated sheet pick up device at an upstream end of the printing press,

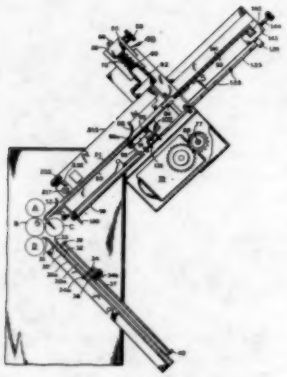
first means coupling said primary suction port to said first vacuum operated means,
secondary vacuum operated means including a vacuum operated sheet slow down device at a delivery end of the printing press,
second means coupling said secondary suction port to said second vacuum operated means, and
orifice means connecting said first and second coupling means.

4,957,284

APPARATUS AND METHOD FOR CONVERTING SHEET FOLDER TO BOOKLET MAKER

Yvan E. Brabant, Boca Raton, Fla., assignor to Profold, Inc., Sebastian, Fla.

Filed Sep. 2, 1988, Ser. No. 239,983
Int. Cl.[5] B41L *43/12*
U.S. Cl. 270—37 19 Claims



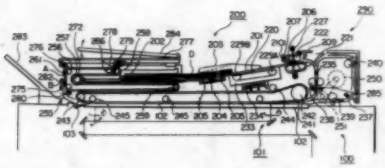
1. In combination with a folder having:
a pair of power-driven rollers operatively arranged to pull down between them a stapled set of sheets of paper;
guide members extending down from said pair of rollers on one side thereof, said guide members defining a downwardly inclined guide recess located on said one side of said pair of rollers, said guide recess having an open upper end positioned to receive the stapled set of sheets pulled down by said pair of rollers;
a stop member positioned in said guide recess in the path of said stapled set of sheets for engagement by the leading edge of said stapled set of sheets to prevent the continued advance of said set of sheets down into said guide recess;
and a third roller positioned below one of said pair of rollers and cooperable therewith to define a fold gap through which said stapled set of sheets is pulled after said leading edge of said stapled set of sheets engages said stop member and the trailing part of the stapled set of sheets continues to be pulled down between said pair of rollers;
the improvement which comprises a stapling and guide unit attached to said folder above said pair of rollers, said stapling and guide means having:
a stapling station including a power-operated stapling mechanism located above and on said one side of said pair of rollers;
guide means located above and on said one side of said pair of rollers and inclined downward and forward from said stapling station toward said pair of rollers for passing a stapled set of sheets in a straight-line path from said stapling mechanism down to said pair of rollers;
stop means in said guide means spaced from said stapling mechanism by substantially half the length of each sheet and normally positioned for engagement by the leading edge of a stack of sheets in said stapling station to hold said stack against movement down said guide means to said pair of rollers and to position the longitudinal midpoint of each sheet beneath said stapling mechanism;
and means for retracting said stop means from engagement by the leading edge of said stack of sheets when said stapling mechanism staples said stack into a stapled set of said sheets, thereby permitting said stapled set of sheets to pass down said guide means to said pair of rollers.

4,957,285

DOCUMENT FEEDER WITH SHEET EDGE REGULATING MECHANISM

Yasushi Yamada, Tokyo, Japan, assignor to Konica Corporation, Tokyo, Japan

Filed Apr. 5, 1989, Ser. No. 333,399
Claims priority, application Japan, Apr. 7, 1988, 63-87592; Apr. 15, 1988, 63-51030[U]
Int. Cl.[5] B65H *5/00*
U.S. Cl. 271—3.1 5 Claims



1. A document feeder for use in a copy machine comprising:
a document sheet stacker adapted to receive a stack of document sheets thereon;
separation means for separating a sheet from the bottom of the stack of document sheets and feeding the separated sheet to a copying member;
means for shifting the stack of document sheets from said document sheet stacker to said separation means;
gate means disposed between said document sheet stacker and said separation means and adapted to be lifted so as to regulate the passage of the stack of document sheets so that when said gate means is lowered, the leading edges of the document sheets in the stack come in contact with said gate means, whereby the leading edges of the documents are aligned, and while said gate means is lifted upwardly, the stack of document sheets passes under said gate means; and
sheet edge-regulating means attached to said gate means so that when said gate means is lifted upwardly, said sheet edge-regulating means is moved adjacent the upper surface of the stack of document sheets and regulates the leading edge of the stack of document sheets so as to pass under said gate means.

4,957,286

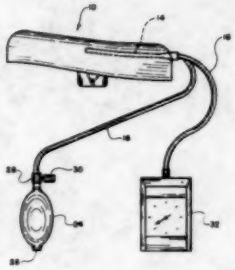
SEAT WITH WEIGHT MEASURING CAPABILITIES

Charles A. Persons, II, Huron, and James D. Goostree, Norwalk, both of Ohio, assignors to The Faulhaber Co., Monroeville, Ohio

Continuation of Ser. No. 257,763, Oct. 14, 1988, abandoned. This application Feb. 16, 1990, Ser. No. 481,787
Int. Cl.[5] A63B *23/00*
U.S. Cl. 272—73 5 Claims

1. A weight monitoring exercise device comprising:
a bicycle seat;
a seat-connecting post;
pedal-driven exercise means; and
weight monitoring means,
in which said bicycle seat is attached to said seat-connecting post, and said post is connected to said exercise means, wherein

said weight monitoring means comprises a compressible, gas-holding container elastomeric mounted within said seat, said seat comprising a seat cover enclosing seat cushioning material which encapsulates said container said container connected to a meter responsive to changes in the pressure of said gas, said meter being mounted on said exercise means so as to be visible to an individual seated on said seat, whereby a person on said seat can observe meter reading differences occurring as the result of gas pressure changes in said container caused from body-weight loss produced by an individual exercising on said device.



4,957,287

TOY-GAME DEVICE

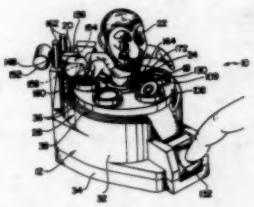
Toshio Kobayashi, Chiba Prefecture, Japan, assignor to Asahi Corporation, Tokyo, Japan

Filed Nov. 18, 1988, Ser. No. 273,221

Claims priority, application Japan, Nov. 21, 1987, 62-178205

Int. Cl.[5] A63F 9/00

U.S. Cl. 273—1.099 **7 Claims**



5. A toy-game device comprising a base, a timer in said base actuatable for a set period of time, a rotatable platform on said base operatively connected to said timer for rotation during said set period of time, a plurality of substantially flat game discs receivable on said platform, receiving means having an upwardly open slot therein, retrieving means for retrieving said game discs from said platform, one of either said retrieving means or each of said game discs including magnetic means, the other of either said retrieving means or each of said game discs including magnetically responsive means, said retrieving means being operative for magnetically retrieving said game discs from said platform and for depositing them in said slot, the magnetic means or the magnetically responsive means on each of said game discs being exposed on only one side of each of said game discs, means for individually selectively turning said game discs over to position the magnetic means or the magnetically responsive means thereon in upwardly facing relation, said retrieving means being operative for retrieving only those game discs positioned on said platform so that the magnetic means or the magnetically responsive means thereon are in upwardly facing relation, an action element on said base and means operative for ejecting said action element from said base upon the expiration of said set period of time.

4,957,288

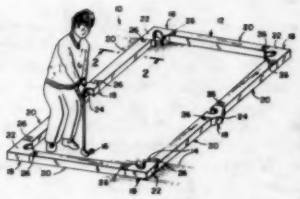
PUTTER POOL BILLIARD GAME

Hugh B. Kantner, Box 1931, Klamath Falls, Oreg. 97601, and George Spector, 233 Broadway, Rm. 3815, New York, N.Y. 10007

Filed Sep. 28, 1988, Ser. No. 250,229

Int. Cl.[5] A63D 15/00

U.S. Cl. 273—2 **1 Claim**



1. A golf putting game which comprises:

(a) a framework suitable for use on a flat support surface, in which said frame-work is in the shape of a rectangle to retain a played golf ball within the bounds of said framework;

(b) means disposed within said framework for capturing a golf ball during play of said game, wherein said framework includes a plurality of barrier rail segments comprising;

(c) four corner pockets, means interlocking, each of said corner pockets between two of said rail segments at each corner of said framework; and

(d) a pair of side pockets, means interlocking each of said side pockets between two of said rail segments along each long side of said framework, a plurality of flexible bumpers, each of said bumpers being triangular in cross section and disposed on the interior wall of said rail segments of said framework to provide a uniform golf ball rebound during the play of said game;

(e) each of said rail segments having a bottom undercut extending inwardly from the interior wall thereof;

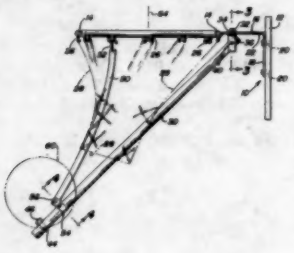
(f) a rectangular felt floor mat being of a size so that its edge can be held between said bottom undercut and the flat support surface to simulate a pool table surface for the golf ball to be played upon, each of said corner pockets and each of said side pockets includes an entrance opening of predetermined waste and an inwardly inclined floor which butts against the edge of said felt floor mat so that a golf ball can be positively retained therein during the play of said game, and wherein each said side pocket has a parallel side wall at said entrance opening and wherein said inwardly inclined floor has a circular portion of larger diameter than the width of said entrance opening.

4,957,289

BALL RETURN MECHANISM FOR A BASKETBALL GAME

Jeffrey R. Kotlarz, 2402 Antonia La., Warren Mich. 48091

Filed Feb. 21, 1989, Ser. No. 312,958
Int. Cl.[5] A63B *69/00*
U.S. Cl. 273—1.5 A **19 Claims**



1. In association with a basketball goal that comprises a backboard, a circular rim horizontally oriented forward of the backboard, bracket means connecting the circular rim to the backboard, and a mechanism for deflecting a basketball forwardly in a direction away from said backboard after passage through said circular rim, said mechanism comprising:

two generally parallel rails disposed in the space below said circular rim and at an angle thereto, said rails having a length greater than the diameter of said circular rim;

said rails having rear ends located a predetermined distance behind said circular rim and connected to said bracket means below the plane of said circular rim, and front ends extending downwardly away from said circular rim preferable at an angle between 30 and 60 degrees;

said rails being located symmetrically in opposite transverse directions from a front-to-rear vertical plane passing through the central axis of said circular rim; and

said rails being spaced apart by a distance that is less than the diameter of said basketball, whereby said basketball is caused to roll downwardly and forwardly between said rails after passage through said circular rim.

4,957,290

CROQUET GAME MODIFIED

John J. Major, 27220 SW. 143 Ave., Naranja, Fla. 33032, and George Spector, 233 Broadway RM 3815, New York, N.Y. 10007

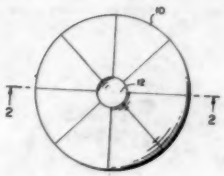
Filed Nov. 13, 1989, Ser. No. 435,552
Int. Cl.[5] A63B *71/00*
U.S. Cl. 273—56 **1 Claim**

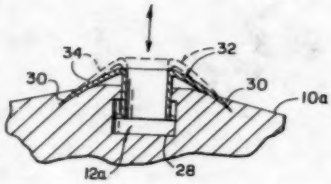
1. Modified croquet equipment comprising, a gradual frustum conical shaped dish member having a tubular shaped, vertically extending center cup for receiving a ball during play of a croquet game;

(a) a track formed within a lower portion of said center cup;

(b) an annular slot spaced from said cup and formed in said dish member about said center cup;

(c) a height adjustable sleeve telescopingly fitting in said center cup and having means at one end thereof engaging said track an annular flexible flange having spaced apart edges, one of said edges being attached to the other end of said sleeve, said flange extending downwardly from said sleeve and having its other edge slidably engaging said slot said sleeve rides within said track so that said other edge of said flexible flange can move within said annular slot to change the angle of inclination of said flange relative to a playing surface and thus change the angle of





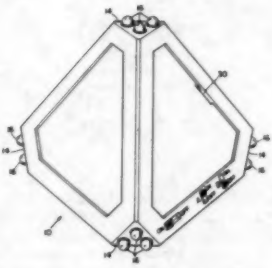
entry into said cup of a ball used during the play of the croquet game.

4,957,291

ELECTRONIC PUZZLE

Donald C. Mifflitt, Chelmsford; Angelo Tortola, Lexington; Charles S. Sebor, Reading, and Robert L. Halliday, Lexington, all of Mass., assignors to Venture Technologies, Inc., North Billerica, Mass.

Continuation of Ser. No. 166,927, Mar. 11, 1988, abandoned.
This application Nov. 6, 1989, Ser. No. 433,389
Int. Cl.[5] A63F *9/06*
U.S. Cl. 273—153 R **14 Claims**



1. An electronic puzzle comprising:

(a) a puzzle body including a plurality of lightable positions, each lightable position capable of being illuminated in a plurality of colors;

(b) a first digital circuit for establishing color state vectors defining patterns of color changes for each lightable position, a single color state vector being assigned to a game being played;

(c) a second digital circuit for establishing one or more game rules, each game rule defining the application of one of said color state vectors, a single game rule being assigned to a game being played; and

(d) a third circuit, interconnected with said first digital circuit and said second digital circuit, for changing the color,

if required by the game rule, of at least one of said lightable positions;

whereby in response to a manipulation of said puzzle body to bring one of said lightable positions into a reference plane said first digital circuit, said second digital circuit, and said third circuit cooperate to change the color of at least one of said lightable positions to the next color, if required by the game rule, said next color being determined by the color state vector of the game being played and by the game rule of said game being played.

4,957,292

LOOP TRANSFER GAME DEVICE

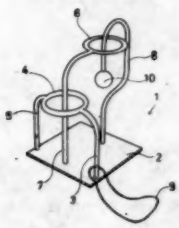
Yasuhiro Ushiyama, OX Co., Ltd. c/o, 6-7, Furujin-machi, Takamatsu-City, Kagawa, Japan

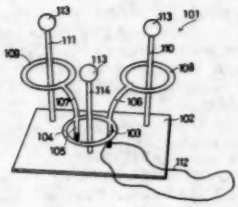
Filed Jan. 10, 1990, Ser. No. 463,206

Claims priority, application Japan, Apr. 25, 1989, 1-106943

Int. Cl.[5] A63F *9/08*

U.S. Cl. 273—159 **3 Claims**





2. A loop transfer game device comprising a first pin mounted on a base member, a second pin mounted on said base member and connected to said first pin by a first annular obstruction, a couple of first and second obstruction pins fixedly mounted to said first annular obstruction, a couple of second and third annular obstructions fixedly mounted to the distal ends of said first and second obstruction pins respectively, a couple of third and fourth obstruction pins extending through the insides of said second and third annular obstructions respectively, and a loop made of flexible material and provided so as to encircle either said first or second pin.

4,957,293

GOLF BALL MARKER AND HOLDER APPARATUS FOR MARKER

Danny L. Byrd, 2317 W. Dobbins Rd., Phoenix, Ariz. 85041

Continuation-in-part of Ser. No. 205,474, Jun. 13, 1988, abandoned. This application Jun. 5, 1989, Ser. No. 361,359

Int. Cl.[5] A63B *53/00*

U.S. Cl. 273—162 D **5 Claims**

1. Golf ball marker apparatus usable in combination with a putter having a shaft and a grip on the end of the shaft and a hole having a diameter in the grip, comprising, in combination:

marker means for marking the location of a golf ball on a putting green, including

a marker head,

stem means secured to the marker head and adapted to extend into the green, including

a first portion adjacent to the marker head, having a first diameter,

a second portion secured to the first portion and having a second diameter which is less than the first diameter and which tapers inwardly to a third diameter remote from the first portion, and

a bottom portion on the stem means remote from the marker head having an outwardly sloping portion adjacent to the third diameter extending to a generally cylindrical portion and a conical tip remote from the outwardly sloping portion; and

anchor means for holding the marker means to the grip of the putter shaft, including

a head

an anchor stem secured to the head and extending through the hole in the grip for securing the anchor means to the

grip and having a diameter slightly greater than the diameter of the hole in the grip,

a tip portion secured to the anchor stem remote from the head and having a diameter greater than the diameter of the anchor stem,

a shoulder between the anchor stem and the tip portion and adapted to be disposed against the grip about the hole when the anchor means is secured to the grip,

a first bore in the head and anchor stem for receiving the stem means of the marker means and having an inner diameter about equal to the first diameter of the first portion of the stem means,

ridge means extending circumferentially in the first bore in the anchor stem and having an inner diameter less than the third diameter of the second portion of the stem means and defining a secondary holding element for the marker means, and

slot means extending through the anchor stem and the tip portion to allow the anchor stem and the tip portion to expand as the stem means of the marker means extends into the first bore.

4,957,294

GOLF CLUB HEAD

D. Clayton Long, Albany, Ga., assignor to MacGregor Golf Company, Albany, Ga.

Division of Ser. No. 66,077, Jun. 24, 1987, Pat. No. 4,802,672. This application May 13, 1988, Ser. No. 205,682

Int. Cl.[5] A63B *53/04*

U.S. Cl. 273—169 **1 Claim**

1. A golf iron head with a center of mass comprising:

a. a planar striking face;

b. a heel;

c. a toe;

d. a sole;

e. a top;

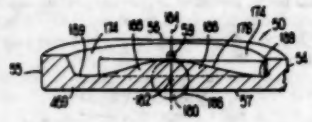
f. a hosel connected to the top adjacent to the heel; and

g. a backside comprising:

i. a cavity with a floor surface and sides;

ii. a longitudinal segment of a vertical elongated support

column having a circumference and an axis wherein the column is positioned behind the planar striking face and said axis is parallel to the planar face and lies within a plane that is perpendicular to the planar face and includes the center of mass; and



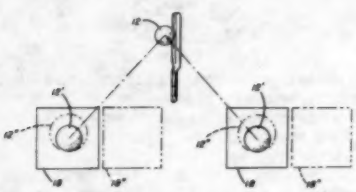
iii. fill material that renders the floor surface smooth and continuous between the surface of said segment and the periphery of the floor adjacent to the sides.

4,957,295

HEAD MOVEMENT INDICATING DEVICE AND METHOD

Sam A. McConkey, 1919 Lathrop St., Fairbanks, Ak. 99701

Filed Sep. 20, 1989, Ser. No. 410,103
Int. Cl.[5] A63B *69/36*
U.S. Cl. 273—183 B **20 Claims**



1. An optical device for determining movement of the head of a user relative to a an object that the user is viewing while performing a specific task comprising:

a pair of spectacles worn by the user;

a flexible optical altering membrane substantially smaller than the lenses of said spectacles being adhesively secured to each lens of said spectacles in the area of said lens through which the user normally views said object, said optical altering membrane being selectively removable and reattachable to said spectacle lenses;

said optical altering membrane causing said object to appear to the user to be in a first position when viewed through said optical altering membrane and to "jump" to a second position when viewed through the portions of said spectacle lenses not covered by said membrane.

4,957,296

GOLF BALL DISPENSER AND TEEING DEVICE

Howard M. Turnidge, Sacramento, and Theodore Talvan, Redlands, both of Calif., assignors to Howco Trust

Continuation-in-part of Ser. No. 746,129, Jun. 18, 1985, abandoned. This application Mar. 30, 1987, Ser. No. 31,563
Int. Cl.[5] A63B *69/00*
U.S. Cl. 273—201 **7 Claims**

1. A golf ball teeing apparatus, comprising:

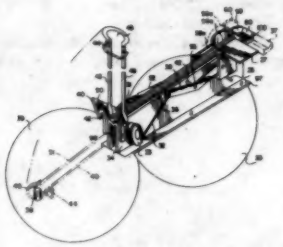
(a) a frame structure having a golf ball track thereon, said track being linear and sloping between upper and lower ends thereof;

(b) receiver means, separate and in addition to said track, for receiving a golf ball from a dispenser, said receiver being movably attached to said frame and positioned at said upper end of said track and arranged, upon actuation thereof, to release a golf ball onto said track;

(c) an actuator member mounted on said frame structure and movable between rest and active positions;

(d) means coupled to said actuator member for releasing said golf ball from said receiver means onto said upper end of said track in response to movement of said actuator member from its rest to its actuated position, thereby permitting said golf ball to roll down said track;

(e) an arm structure having first and second ends and movably mounted relative to said frame structure, said arm structure being operable between extended and retracted



positions in response to movement of said actuator member from its rest to its active position, said arm structure in said extended position being positioned below said lower end of said track, being downwardly sloping, and forming a continuation of said lower end of said track , said first end of said arm structure being operatively and directly coupled to said lower end of said track; and

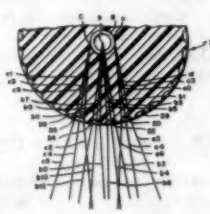
(f) a centering member at said second end of said arm structure for receiving said, golf ball from said arm structure when it forms said continuation of said track and releasing said golf ball in a predetermined horizontl alignment relative to said frame structure for depositing said golf ball onto a tee therefor.

4,957,297

METHOD OF PLAYING GOLF AT NIGHT

Nelson F. Newcomb, and Nelson F. Newcomb, Jr., both of Windleblo Rd., Mirror Lake, N.H. 03853

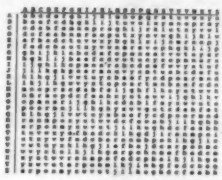
Continuation of Ser. No. 98,521, Sep. 18, 1987, Pat. No. 4,878,674, which is a continuation of Ser. No. 816,236, Jan. 6, 1986, Pat. No. 4,695,055. This application Aug. 31, 1989, Ser. No. 401,646
The portion of the term of this patent subsequent to Nov. 7, 2006, has been disclaimed.
Int. Cl.[5] A63B *43/06*
U.S. Cl. 273—213 **3 Claims**



1. A method for enabling a golfer to play golf at night comprising selecting a substantially nonilluminated golf course, and using golf clubs, playing golf using a ball made of a translucent, solid plastic, the surface of which is substantially covered

with light diffusing dimples, said ball being not less than 1.680 inches in diameter nor over 1.620 ounces in weight, and said ball retaining within a diametrically extending hole, an activated chemiluminescent light stick.

4,957,298
PERMUTATION GROUP GAMES
Jack Silverman, 302 W. 87th St., New York, N.Y. 10024
Filed Mar. 22, 1989, Ser. No. 327,076
Int. Cl.[5] A63F *3/00*
U.S. Cl. 273—240 **7 Claims**



1. A game comprising the steps of:
defining a permutation group (X,*) where X is a set of symbols and * is a two argument operation on the symbols of said set, said group having closure, associativity, an identity element and an inverse for each element of the set;
encoding a series of plaintext symbols of the set X by replacing each plaintext symbol with a symbol pair comprising two of the three symbols x, y, z in the relation x*y=z and where x, y, and z are each elements of the set X and one of x, y and z is the plaintext symbol to be encoded; and
decoding the encoded symbol pairs to recover the series of plaintext symbols.

4,957,299
BALLOON TOY AND GAME
Royest L. Richardson, 305 West Home, Flint, Mich. 48505
Filed May 1, 1989, Ser. No. 345,271
Int. Cl.[5] A63F *9/00*
U.S. Cl. 273—409 **19 Claims**

1. An amusement device in combination with a game board, comprising:
a balloon;
a tube having a first end, a second end, main portion;
a wing having flexibility;

means for attaching the balloon to the first end of the tube;
means for attaching the wing to the main portion of the tube.

4,957,300
RECREATIONAL PROJECTILE
Joel C. Storry, 9443 N. 33rd Way, Phoenix, Ariz. 85028
Filed Dec. 19, 1988, Ser. No. 286,217
Int. Cl.[5] A63B *65/00*
U.S. Cl. 273—428 **4 Claims**

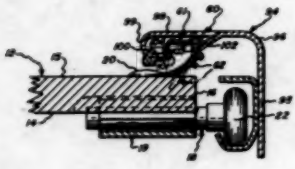
3. A recreational projectile which displays rotational motion imparted when said projectile is thrown, said projectile comprising a lightweight strip of resilient plastic, the strip having a noncircular, elongated cross-sectional area with a width - to - thickness ratio of at least 3, the strip being coiled into a readily compressible helix defining a generally ellipsoidal volume, said strip coiled at an angle of helical advancement sufficient to create between adjacent windings of the coiled strip substantially uniform gaps of between approximately 0.125 and 0.50 inches to impart the visual impression of a rotating screw when the projectile is thrown.

4,957,301
NON-CRUSHABLE SIDE SEAL MEMBERS FOR A ROLL-UP DOOR
Roy T. Clay, Jr., Snyder, and Donald J. Whiting, Jr., Akron, both of N.Y., assignors to Whiting Roll-Up Door Mfg., Corp., Akron, N.Y.
Filed Oct. 2, 1989, Ser. No. 416,050
Int. Cl.[5] B60J *10/00*
U.S. Cl. 277—12 **27 Claims**

1. A seal member for sealing the gap between first and second surfaces arranged in facing relation to one another, said surfaces being mounted for movement toward and away from one another and being mounted for relative movement in substantially-parallel planes, said seal member comprising:

a first portion mounted fast to one of said surfaces, said first portion having a first abutment surface extending toward a portion of the other of said surfaces; and

a second portion mounted on said first portion at a location spaced laterally from said first abutment surface and extending away from said first portion to flexibly engage the other of said surfaces, said abutment surface being so



positioned and arranged that said abutment surface will engage said second surface when said surfaces move toward one another to prevent said second portion from being crushed between said first portion and said other surfaces;

whereby said second portion will not substantially impede relative movement between said surfaces in parallel planes.

4,957,302

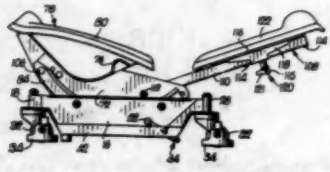
WORKER SUPPORT APPARATUS

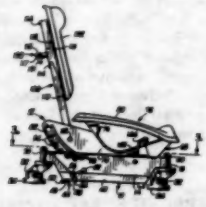
Donald J. Maxwell, Lincoln, Nebr., assignor to Eidos Corporation, David City, Nebr.

Filed Feb. 15, 1989, Ser. No. 311,175

Int. Cl.[5] B25H *5/00*

U.S. Cl. 280—32.6 **18 Claims**





1. A low-profile positioning apparatus for selectively supporting a worker in one of a plurality of positions beneath a structure to be worked on by the worker, the apparatus comprising:

a support structure including a pair of walls which are spaced from one another in the horizontal direction and which include opposing vertical wall surfaces;

a seat assembly including a frame, a seat and a back support member, the frame having a width in the horizontal direction which is less than the distance by which the pair of walls of the support structure are spaced and a pair of opposing frame surfaces extending between the opposing vertical wall surfaces of the support structure, the seat and back support member being mounted on the frame for movement with the frame;

seat assembly positioning means for permitting movement of the frame relative to the support structure along an upright arcuate path to selectively position the seat assembly in one of a plurality of positions relative to the support structure and disposed horizontally between one of the frame surfaces and an adjacent vertical wall surface; and

back support positioning means for permitting pivotal movement of the back support member relative to the frame to selectively position the back support member in one of a plurality of positions relative to the seat.

4,957,303

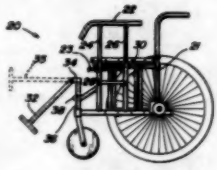
FOLDABLE ADJUSTABLE WHEELCHAIR

Roger J. Romatz, 8520 Division, Richmond, Mich. 48062-0010

Filed Mar. 27, 1989, Ser. No. 329,390

Int. Cl.[5] A61G *5/02*; B62M *1/14*

U.S. Cl. 280—250.1 **13 Claims**



1. A frame for use on a wheelchair that comprises:

a main frame section;

leg support means that are vertically adjustable with respect to said main frame section, said leg support means is pivotally mounted to a post, said post being rotatably received within said main frame section;

said leg support means having an associated ratchet fixed thereto, said post having a dog pivotally pinned thereto, and said dog being biased to a locked position where it engages a tooth of said ratchet in order to fix said leg support means at a selected position and provide adjustability for said leg support means and said leg support means being adjusted into one of several vertical position and in addition being rotated into one of several rotational positions with respect to said main frame section; and

arm rest means being mounted at one of several positions with respect to said main frame section.

4,957,304

SKI COMPRISING A LONGITUDINAL RIB AT ITS TOP PART

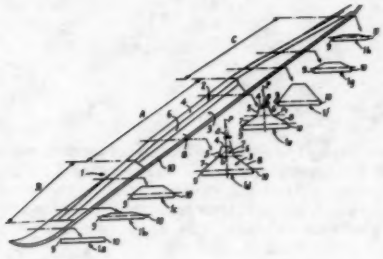
Jean-Luc Diard; Philippe Grandjacques, and Gilles Recher, all of Annecy, France, assignors to Salomon S.A., Annecy, France

PCT No. PCT/FR88/00061, § 371 Date Oct. 5, 1988, § 102(e) Date Oct. 5, 1988, PCT Pub. No. WO88/05676, PCT Pub. Date Aug. 11, 1988

PCT Filed Feb. 4, 1988, Ser. No. 275,131

Int. Cl.[5] A63C 5/04

U.S. Cl. 280—609 33 Claims



1. A ski, having a vertical longitudinal plane, comprising a longitudinal guidance rib having a top part, a sole, a front end part, a rear end part and a central area having a bearing portion to support and guide the sole of a shoe or boot, said central area including a first section and a second section superposed on said first section, said first section and second section each having the shape of a quadrilateral wherein the upper side of said first section and the lower side of said second section define a common imaginary line between said first section and said second section, lateral sides of said first section converging upwardly and being more inclined with respect to said vertical longitudinal plane than lateral sides of said second section, said central area including a front area extending between said bearing portion and said front end part and a rear area extending between said bearing portion and said rear end part, said front area and rear area each having the form of a single quadrilateral, said front end part and rear end part each including a flat upper surface, said front area, said rear area, and said bearing portion thereby joining the flat upper surface of said front end part and said rear end part.

4,957,305

BINDING FOR CROSS-COUNTRY SKI

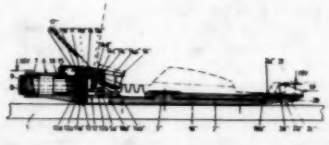
Henry Freisinger; Karl Stritzl, both of Vienna, and Franz Luschnig, Traisksirchen, all of Austria, assignors to TMC Corporation, Switzerland

Division of Ser. No. 153,835, Dec. 18, 1987, Pat. No. 4,900,053. This application Sep. 8, 1989, Ser. No. 404,056

Claims priority, application Austria, Apr. 30, 1986, 1163/86

Int. Cl.[5] A63C 9/081

U.S. Cl. 280—618 3 Claims



2. A heel-holder for a safety ski binding comprising:

a base plate adapted to be mounted to the upper surface of a ski, the base plate including a raised pin at an intermediate portion and a first and second extension at a first end thereof;

a pivot plate rotatable about said raised pin;

a housing integral with the pivot plate and including a top wall and a bottom wall horizontally pivotable about the raised pin, and including a cross-pin disposed at said top wall;

a sole-holder vertically pivotable about the cross-pin and supported by the first and second extensions, the sole holder including a hollow portion forming a control cam on an upper wall of the hollow portion;

a snap-in device for releasing the binding provided in the housing, the snap-in device comprising a snap-in rocker pivotably mounted in the housing about a pivot pin arranged parallel to the cross pin and a control member pivotably mounted on the snap-in rocker and perpendicular to the pivot pin the control member being substantially U-shaped in configuration and including a pair of horizontal legs and a vertical leg joining the horizontal legs the snap-in rocker engaging the control cam of the sole-holder and the control member engaging at least one of the first and second base-plate extensions; and

a spring for loading the snap-in device, the spring being capable of applying a force for releasing the binding, wherein the snap-in device reduces the spring force required for releasing the binding during both vertical pivoting of the sole-holder and horizontal pivoting of the housing.

4,957,306

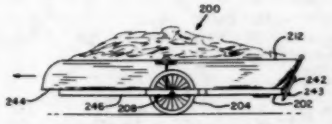
LEAF WAGON

George Greenberg, 367 Orchard Beach, Mastic Beach, N.Y. 11951

Continuation-in-part of Ser. No. 297,216, Jan. 17, 1989. This application Jun. 21, 1989, Ser. No. 369,641

Int. Cl.[5] B62B 1/20

U.S. Cl. 280—652 4 Claims



1. A cart for carrying leaves comprising:

a. a first flat rectangular frame supporting a first basket with a flat bottom open at one end, enclosed by two side walls and a a rear wall;

b. a second flat rectangular frame supporting a second basket with a flat bottom having two side walls and open at both ends having a cross section identical to that of said first basket;

c. hinge means attaching the exposed edges of the side walls at the top so that said second basket is rotatable between a first position wherein both said baskets are aligned forming said cart with the two flat bottoms arranged to form a continuous flat bottom surface in an open position and a second position wherein said second basket is resting upside down on said first basket, the side walls of both said baskets retaining their shape when said cart is folded;

d. means mounted on opposite sides of said first frame supporting a pair of wheels;

e. handle means extending from said first frame; and

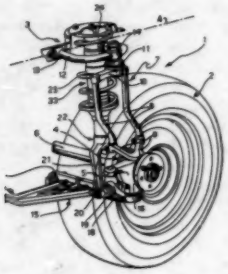
f. leg means extending from the rear wall of said first basket to provide additional ground support for said cart.

4,957,307

SUSPENSION FOR THE FRONT STEERED WHEELS OF A MOTOR VEHICLE

Romolo Gandiglio, Cambiano, Italy, assignor to Fiat Auto S.P.A., Turin, Italy

Filed Jun. 27, 1989, Ser. No. 371,920
Claims priority, application Italy, Jul. 11, 1988, 67648 A/88
Int. Cl.[5] B60K *17/30*
U.S. Cl. 280—666 1 Claim



1. A suspension for the front steered wheels of a motor vehicle, having a frame with a longitudinal axis, comprising:

a wheel provided with a wheel support,

an articulation arm rigidly connected to the support and extending substantially vertically,

an upper arm articulated at one end to the frame about an axis substantially parallel to the longitudinal axis of the vehicle and at the other end to the upper end of the articulation arm,

a lower arm articulated at one end to the frame about an axis substantially parallel to the longitudinal axis of the vehicle and at the other end to the lower end of the wheel support and

a shock-absorber with a coaxial helical spring arranged substantially vertically, with its upper end fixed to the frame and its lower end articulated to the lower arm,

wherein the articulation arm is fork-shaped with two separate elements which are spaced apart in a substantially longitudinal direction.

4,957,308

REAR SUSPENSION APPARATUS FOR MOTOR VEHICLES

Shozo Takizawa, Okazaki, Japan, assignor to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 24, 1989, Ser. No. 384,493
Claims priority, application Japan, Jul. 29, 1988, 63-190124; Jul. 29, 1988, 63-190125; Jul. 29, 1988, 63-190126; Jul. 29, 1988, 63-190127
Int. Cl.[5] B60G *3/00*
U.S. Cl. 280—666 14 Claims

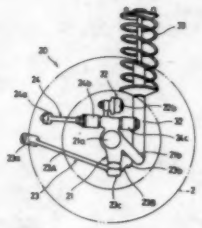
1. A rear suspension apparatus for connection between a rear wheel and a vehicle body of a motor vehicle, comprising:

a wheel carrier rotatably supporting the rear wheel and having an upper portion and a lower portion;

an upper arm extending inward from said wheel carrier in a widthwise direction of the vehicle body, and having an outer end pivotably connected to the upper portion of said wheel carrier and an inner end pivotably connected to the vehicle body;

a lower arm assembly extending inwardly of the vehicle body from said wheel carrier, and having a plurality of inner ends pivotably connected to the vehicle body and at least one outer end pivotably connected to the lower portion of said wheel carrier and cooperating with the outer end of said upper arm to define a center line of a virtual kingpin; and

a swing arm extending from said wheel carrier inwardly of the vehicle body and obliquely at a predetermined angle to a longitudinal direction of the vehicle body, said swing



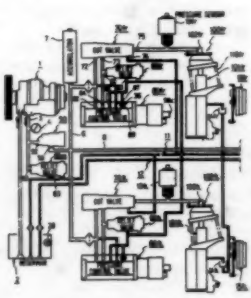
arm having two outer ends located between the outer end of said upper arm and the outer end of said lower arm assembly and pivotably connected to said wheel carrier by two pivots set apart from each other in the longitudinal direction of the vehicle body, and an inner end pivotably connected to the vehicle body.

4,957,309

PRESSURE CONTROL SYSTEM FOR SUSPENSION

Osamu Komazawa, Nagoya; Shigetaka Isogai, Nishio; Shuuichi Buma, Toyota; Toshio Onuma, Susono; Takashi Yonekawa, Mishima, and Katsuhiko Hattori, Nagoya, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota; Kabushiki Kaisha Toyota Chuo Kenkyusho and Aisin Seiki Kabushiki Kaisha, both of Aichi, all of, Japan

Filed Dec. 27, 1989, Ser. No. 458,240
Claims priority, application Japan, Dec. 29, 1988, 63-331365; Dec. 29, 1988, 63-331366; Jan. 31, 1989, 1-22246
Int. Cl.[5] B60G *11/26*
U.S. Cl. 280—707 8 Claims



1. Pressure control system for suspension comprising

a pressure source for supply a fluid which is drawn from a reservoir to a high pressure piping under a high pressure, which delivers a hydraulic fluid to a suspension which is adapted to extend and shrink in response to a pressure supplied thereto;

and a pressure control valve including a line pressure port communicating with the high pressure piping, a low pressure port communicating with a fluid return path to the reservoir, an output port applying a pressure to the suspension, a target pressure space communicating with the line pressure port through an orifice, a spool responsive to a pressure from the output port applied to its one end to be driven in a direction to reduce a degree of communication

between the line pressure port and the output port and to increase a degree of communication between the low pressure port and the output port and also responsive to the pressure from the target pressure space applied to its other end to be driven in a direction to increase a degree of communication between the line pressure port and the output port and to reduce a degree of communication between the low pressure port and the output port, a valve element for defining a degree of communication between the target pressure space and the fluid return path to the reservoir, electrically driven drive means for driving the valve element in a direction to increase/decrease the degree of communication, and an orifice interposed in a channel between the fluid return path to the reservoir and an operating space for the valve element.

4,957,310

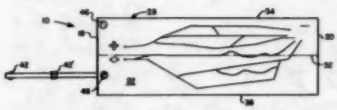
DETACHABLE SKI OR TERRAIN MAP

Michael R. Bissonnette, P.O. Box 196, Terryville, Conn. 06786

Filed Nov. 20, 1989, Ser. No. 439,558

Int. Cl.[5] G09B *29/00*

U.S. Cl. 283—34 **14 Claims**



1. A terrain map comprising:

a flexible, substantially flat substrate having inner and outer surfaces, the inner surface having a terrain map depicted thereon, the substrate being foldable into a band having first and second longitudinal ends;

first attachment means carried by one surface adjacent the first end of the band;

second attachment means carried by said one surface adjacent the second end of the band and detachably engageable with the first attachment means;

whereby as one end of the band is circled back to overlap with the other end while being wrapped around a generally cylindrical central body, the first and second attachment means can be joined to secure the terrain map to the central body.

4,957,311

DIRECT MAIL ADVERTISING SYSTEM

Herman S. Geisenheimer, c/o Our Way Studio, 195 Main St., Hackensack, N.J. 07601

Continuation of Ser. No. 93,245, Sep. 4, 1987, abandoned. This application Jul. 26, 1989, Ser. No. 385,930

Int. Cl.[5] G09F *11/00, 11/30*; G09B *12/22*; B42D *15/00*

U.S. Cl. 283—56 **10 Claims**

1. A direct mail advertising system for distribution to potential customers on a mailing list, the system comprising a plurality of cards and a mailing packet, the plurality of cards being carried in the packet, each card of the plurality including a pair of parallel longitudinal edges and perforation means extending between the longitudinal edges along a straight line perpendicular to the longitudinal edges, the perforation means for separating the card into two portions, one of the portions comprising an index card, a portion of each longitudinal edge comprising a side edge of each index card, the one portion including means for attachment to a rail type file for storage and retrieval, the means for attachment including a pair of necked apertures cut through the one portion and opening into a peripheral edge of the one portion, the one portion including reference information stored thereon, the reference information comprising directions for use of an advertiser's product in food recipe format, the other portion including means for response usage comprising means for redemption in conjunction with the purchase of a food product, the other portion

having a surface area not substantially greater than twice the surface area of the index card.

4,957,312

SALES RECORDS

Peter S. Morello, 3 Stafford St., Unit 2, Plymouth, Mass. 02360, assignor to Peter S. Morello, Plymouth, Mass.

Filed Dec. 7, 1989, Ser. No. 447,380

Int. Cl.[5] B42D *15/00*

U.S. Cl. 283—89 **7 Claims**

1. A method of printing a sales record comprising a plurality of alphanumeric characters describing the sale to which the record pertains, which method comprises printing different parts of at least the majority of the characters in different colors and in which the characters are printed from ink carried on a ribbon that is automatically advanced during use and which is split in the direction of advance into contiguous split portions and carries different colors on the contiguous split portions of the ribbon.

4,957,313

EMERGENCY SUSPENSION SYSTEM FOR DRILL CASINGS

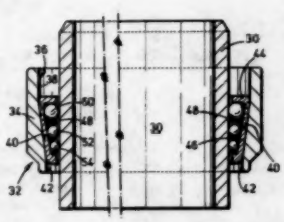
Brian MacIntyre, Milngavie; Sean McAvoy, Coatbridge, and Frank Close, Airdrie, all of Scotland, assignors to Cooper Industries, Inc., Houston, Tex.

Filed Jun. 14, 1989, Ser. No. 366,766

Claims priority, application United Kingdom, Jun. 21, 1988, 8814699

Int. Cl.[5] F16L *21/00*

U.S. Cl. 285—144 **18 Claims**



1. A suspension system for use in supporting a tubular member such as a drill casing for use in a wellhead, comprising an annular bowl member having an internal tapered annular surface which reduces in diameter from its upper to its lower end and a support means comprising an annular support element

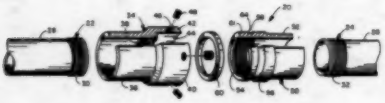
arrangement at least partially formed from resilient material and a plurality of support members at least partially embedded in said resilient material and having a circular cross-section in at least one direction, said members forming a plurality of annular arrays adapted to engage said tapered annular surface and to surround said tubular member, the uppermost of said arrays comprising support members having said circular cross-section larger than that of a lowermost of said arrays.

4,957,314

CONDUIT COUPLING ASSEMBLY

Raffaele Basile, Chicago Heights, and David A. Shotts, Naperville, both of Ill., assignors to Allied Tube & Conduit Corporation, Harvey, Ill.

Filed Oct. 13, 1989, Ser. No. 421,403
Int. Cl.[5] F16L *33/20*
U.S. Cl. 285—355 7 Claims



1. A conduit coupling assembly for connecting the end portions of a pair of lengths of metallic tubular conduit or the like of substantially the same outside diameter in coaxial relationship, said end portions each having external threads of the same size, said coupling assembly comprising:

an outer coupling member, annular throughout its length, having a first end including an internal screw thread sized for threading onto the end portion of one of the conduits, said outer coupling member also having a second end including an outer wall defining a cylindrical cavity, said outer wall having at least one threaded aperture therethrough opening onto said cavity; and

an annular inner coupling member having a first end for receiving said other conduit, said inner coupling member also having a second end sized for reception in said cavity and an internal screw thread sized for threading onto the end portion of the other of the conduits, said inner coupling member second end having a peripheral groove on its outer surface which can be aligned with said threaded aperture whereby upon reception of the inner coupling member second end in said cavity, said members can be joined by tightening a set screw disposed in said aperture so that said screw extends into said groove, said inner coupling member second end having a length substantially equal to the length of said cavity so that when said members are joined, said inner coupling first end extends beyond said outer coupling.

4,957,315

AUXILIARY LOCK WITH AN EXTENSIBLE DEVICE

Jui C. Lin, 55-10, Ben-Jou Rd., Gang-San Jenn, Kaohsiung Hsien, Taiwan

Filed Nov. 22, 1989, Ser. No. 440,303
Int. Cl.[5] E05B *09/00*
U.S. Cl. 292—337 8 Claims

1. An auxiliary lock with an extensible device comprising:

a cylinder having a dead bolt reciprocable therein and having a faceplate at an outer end combinable with a lid which is provided with an opening through which the dead bolt can be extended from the cylinder a preselected length, the cylinder also having an opening in a wall at an inner end in which adjacent ends of a pair of combining plates are fixedly mounted;

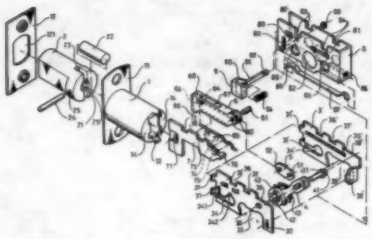
said dead bolt having an inner end connected with a push plate;

said pair of combining plates being disposed in a case movable between advanced and retracted positions, elongated slots in the combining plates for receiving a rotatable shaft of a pivoted moving member mounted in holes in said case, so that the shaft can move in said slots as said case is moved between its advanced and retracted positions;

said shaft of said moving member being provided with a through hole for receiving a turning member of a knob;

means for pivotably connecting the moving member to an adjusting member;

said adjusting member being resiliently biased toward said push plate and having a shoulder portion selectively receivable in one of two spaced notches in said push plate depending upon whether the case is in its advanced or retracted position;



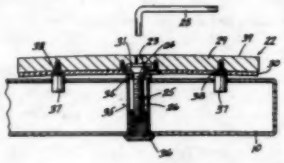
a resiliently biased push button mounted for reciprocable movement in the case, said push button including a slanting face for contacting the adjusting member and causing the adjusting member to move so that the shoulder portion thereof disengages from the one of the two notches in the push plate in which it is then received, said adjusting member then being movable together with the case to move the shoulder portion to the other notch in the push plate, with said shoulder portion then being received in the other notch as the resiliently biased adjusting member returns to an original position, the lock thereby being changed in its size from a short length to a long length or reversely.

4,957,316

ARMATURE FOR ELECTROMAGNETIC LOCK

George Frolov, Farmington, Conn., assignor to Harrow Products, Inc., Grand Rapids, Mich.

Filed Apr. 19, 1989, Ser. No. 340,499
Int. Cl.[5] E05C *17/56*
U.S. Cl. 292—251.5 8 Claims



1. An electromagnetic lock comprising an electromagnet adapted to be mounted to a door frame and an armature adapted to be mounted to a door and attracted to the electromagnet and lock said door in the frame, said armature comprising first and second plates of magnetic flux permeable material, means securing said plates together in surface contact, a device having a headed portion and a shank portion for mounting said armature to a door, said headed portion having a socket therein, said shank portion adapted to be received in and secured to the door, a recess in said first plate receiving the

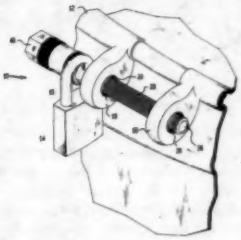
headed portion, said second plate having an opening therein for said shank portion whereby said headed portion is captured between said plates, said second plate having a generally planar portion adjacent the second plate opening and extending to partially enclose the first plate recess and said second plate engaging said first plate at said recess defining portions to structurally reinforce said armature adjacent said recess, and a small passage defined through said first plate to said socket in said headed portion for receiving a turning tool, whereby said device may secure said armature to the door.

4,957,317

DRUM LOCK DEVICE

Gary P. Jakubas, Rutherford, N.J., assignor to Taurus Precision, Inc., Totowa, N.J.

Filed Apr. 27, 1990, Ser. No. 515,637
Int. Cl.[5] B65D *45/30*
U.S. Cl. 292—256.67 **20 Claims**



1. A drum lock device for an open-head drum having a flanged lip at the open end with a mating lid therefor, said drum lock device comprising, in combination:

lug-type ring closure means for annularly attaching said lid to said lip, said ring closure means having a split therethrough with internally threaded lugs on either side thereof;

a lockable bolt having an elongated and extended form with a apertured boss medial the ends thereof, said lockable bolt threadedly attachable to said lugs and, upon rotation of said lockable bolt, operative to widen and narrow said split;

a cap attached to one end of said lockable bolt;

a shuttle wrench captively held between said cap and said apertured boss of said lockable bolt, said shuttle wrench slidably positionable between engagement with and disengagement from said lockable bolt;

whereby, when said shuttle wrench is engaged, the rotation of the lockable bolt is enabled, and, when said shuttle wrench is disengaged the rotation of the lockable bolt is disabled.

4,957,318

VACUUM CUP ASSEMBLY

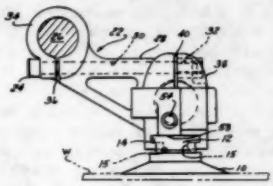
John A. Blatt, 47 Willison, Grosse Pointe Shores, Mich. 48236, assignor to John A. Blatt, Grosse Pointe Shores, Mich.

Continuation-in-part of Ser. No. 165,154, Mar. 7, 1988, Pat. No. 4,828,306. This application Nov. 14, 1988, Ser. No. 271,178
Int. Cl.[5] B66C *1/02*
U.S. Cl. 294—64.1 **19 Claims**

9. A vacuum cup assembly for holding a workpiece when a source of sub-atmospheric pressure is connected to an interior space of said cup, comprising:

a housing having a semi-hemispherical projection; and

a mounting bracket having an elongated portion with a longitudinal bore, a first clamp disposed adjacent one end of the elongated portion and engagable with a rod-like member, a second clamp disposed adjacent another end of the elongated portion and engagable with the semi-hemispherical projection of the housing, single compression bolt means engagable through the longitudinal bore for releasably clamping the first and second clamps simultaneously, hinge means disposed on the second clamp opposite from the longitudinal bore, such that a portion of the



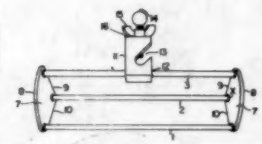
second clamp is hingedly rotatably about the hinge means, said portion of the second clamp including a portion of the longitudinal bore, said portion of the longitudinal bore including threads engagable with the single compression bolt means.

4,957,319

GOLF BALL RETRIEVER

Angelo Bontempo, 19426 Riverview Ave., Rocky River, Ohio 44116

Filed Jun. 15, 1989, Ser. No. 366,643
Int. Cl.[5] A63B *47/02*
U.S. Cl. 294—19.2 **3 Claims**



1. A rake-like retriever for a golf ball or balls comprising: a receptacle therefore comprising a plurality of elongated parallel rods, a pair of oppositely disposed end plates, securing means for securing each of said rods at its opposite ends to said pair of oppositely disposed end plates, the said plates having leading edges, at least two of said rods secured to said plates being spaced a distance less than the diameter of a golf ball and at least one of said rods having a leading edge disposed in spaced relation to another of said rods a distance greater than the diameter of a golf ball, an elongated handle, means for securing the said handle to one of said rods.

4,957,320

METHODS AND APPARATUS FOR MECHANICALLY INTELLIGENT GRASPING

Nathan T. Ulrich, Philadelphia, Pa., assignor to Trustees of the University of Pennsylvania, Philadelphia, Pa.

Filed Aug. 31, 1988, Ser. No. 239,187
Int. Cl.[5] B25J *15/10*; F16D *43/21*
U.S. Cl. 294—106 **9 Claims**

1. Apparatus for grasping an object, comprising:

(a) palmar surface;

(b) at least a first articulated member, comprising at least one rotatable joint disposed above the plane of said palmar surface, said articulated member rotatably attached to said palmar surface, said articulated member comprising:

(i) means for actuating a first rotatable joint comprised of: substantially cylindrical clutch means having screw threads on a portion thereof, said clutch means further having a substantially axial bore therein; a first substantially cylindrical shaft, disposed within the axial bore of said clutch means; means for actuating said clutch means, further comprising means for creating an adjustable frictional force between said shaft and said clutch means; a substantially cylindrical outer body portion, having means for actuating a rotating joint on a portion thereof, comprising a worm gear train, and a second substantially cylindrical shaft affixed thereto, further having a substantially axial bore therein, the axial bore having screw threads thereon; and resilient means for creating a force when displaced disposed within a portion of the substantially axial bore of said substantially cylindrical outer body portion, which transfer force from said clutch means to said outer body portion when said clutch means is threaded into said outer body portion until said clutch means urges against and displaces said resilient means,

whereby, the rotation of said means for actuation is transferred to said means for actuating a rotational joint, until said joint encounters a resistive force, causing said screw threads to unscrew said clutch means away from said resilient means, ceasing the transfer of power to a rotational joint;

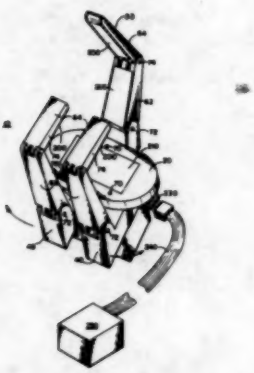
(ii) a first link, having two ends, the proximal end of said first link hingably attached to said first joint, the distal end of said link defining a second rotatable joint;

(iii) a second link, having two ends, the proximal end of said link hingably attached to said second joint; and

(iv) means for actuating said second joint affixed to said actuating means such that when said clutch mechanism ceases to transfer power to said first joint, substantially all of the actuator power is transferred to said second joint; and

(c) means for rotating said first articulated member up to at least 180° about an axis of rotation, whereby said articulated member moves relative to the perimeter of said palmar surface,

whereby the relative motion of said first and second joints is compliantly coupled, such that when said first link encounters a resistive force, said means for actuating a first joint is disconnected and said second joint continues to be activated.

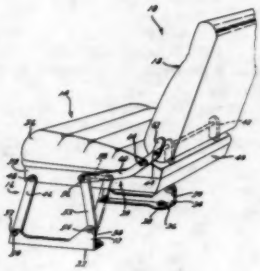


4,957,321

STOWABLE VEHICLE SEAT WITH SEAT BACK POSITION CONTROLLER

Norman G. Martin, Royal Oak, and William J. Eubank, Livonia, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Oct. 12, 1988, Ser. No. 256,447
Int. Cl.[5] B60N 1/02
U.S. Cl. 296—65.1 **11 Claims**



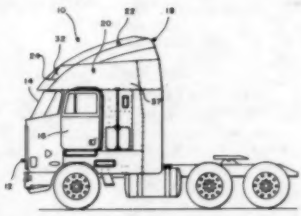
1. In a stowable seat assembly for a vehicle of the type having a horizontally positioned seat cushion, a seat back mounted on the seat cushion for pivotal movement about an axis between a substantially vertical position and a substantially horizontal stowing position and positioning linkage means having upper pivot means for pivotally mounting the positioning linkage means to the seat cushion and lower pivot means pivotally mounted with respect to the vehicle floor to permit movement of the seat cushion between a seating position elevated from the vehicle floor and a stowed position adjacent to the vehicle floor, a controller operative in response to pivotal movement of the seat back to prevent movement of the seat cushion from the seating position to the stowed position when the seat back is in the vertical position.

4,957,322

AERODYNAMICALLY CONFIGURED CAB ROOF ASSEMBLY FOR A TRUCK

Huston Marlowe, Orinda; Michikazu J. Tao, Castro Valley, and Virgil Pound, San Jose, all of Calif., assignors to Paccar Inc., Bellevue, Wash.

Filed Sep. 15, 1988, Ser. No. 244,797
Int. Cl.[5] B62D 35/00
U.S. Cl. 296—180.2 **6 Claims**



1. In a truck including a cab having a front windshield and opposite driver and passenger doors, the improvement comprising a cab roof and a separate and distinct roof fairing disengageably mounted on said cab roof so as to establish a front joint and opposite side joints between the two, said cab roof and roof fairing together presenting a combined front face which extends upward and rearward across said front joint in

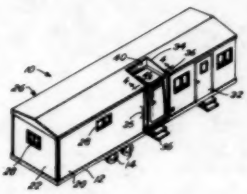
a substantially smooth manner along the entire length of said front joint; said cab roof and roof fairing together presenting opposite combined side faces which extend generally vertically across said side joints in a substantially smooth manner along the entire length of each side joint, and including a sunvisor disengageably connected to and in front of said cab roof at a plurality of points and located over said front windshield so as to establish an equal plurality of substantially smooth joints between the sunvisor and roof.

4,957,323

TRAILER WITH PORTABLE TOILET FACILITIES

David H. Johnson, Nappanee, Ind., assignor to Commercial Structures, Inc., South Bend, Ind.

Filed Apr. 11, 1989, Ser. No. 336,467
Int. Cl.[5] B60R *11/00*
U.S. Cl. 296—181 **3 Claims**



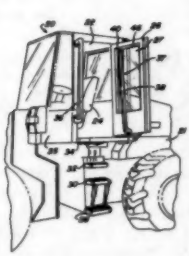
1. In combination, a trailer and a portable toilet facility, wherein said trailer includes an enclosed structure having side walls and a supporting floor carried by a frame, one of said side walls having a recess defined therein, said portable toilet facility removably positioned within said side wall recess and supported by a portion of said trailer floor under said side wall recess, wherein said trailer includes a roof, said recess extending through said roof.

4,957,324

COMBINATION GUIDE RAIL DOOR HANDLE

Robert D. Doescher, Bolingbrook, Ill., and James C. Skeel, Wausau, Wis., assignors to J.I. Case Company, Racine, Wis.

Filed Jul. 13, 1989, Ser. No. 379,296
Int. Cl.[5] B60J *1/02*
U.S. Cl. 296—190 **4 Claims**



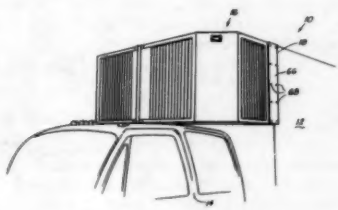
1. A vehicle comprising:
a housing;
an operator's cab area provided within said housing, said housing having a first face facing inwardly towards said cab area and a second face facing the outside environment;
an opening through said housing leading into said cab area from the outside environment;
a door pivotally mounted to said housing at one lateral side of the door opening for rotation about an axis at said opening and having a first face facing into said cab area and a second face facing the outside environment, said door having a closed position blocking entry or exit of an operator between said cab area and the outside environment and being capable of pivotal movement to an open position of allow entry or exit between said cab area and the outside environment;
a first guide rail generally vertically extending and fixedly mounted to said second face of said housing at the opposite lateral side of the door opening; and
a second guide rail mounted to said first face of said door, said second guide rail being angled relative to said axis and angled relative to said first door face, said first and second guide rails aiding an operator in entry or exit between the cab and the outside environment.

4,957,325

AERODYNAMICALLY ENHANCED AIR GRILL

Thomas H. Engel, Rte. 1, Box 339B, Springhill, La. 71075

Continuation-in-part of Ser. No. 140,475, Jan. 4, 1988, Pat. No. 4,840,442. This application May 31, 1989, Ser. No. 359,869
Int. Cl.[5] B62D *35/00*
U.S. Cl. 296—180.2 **18 Claims**

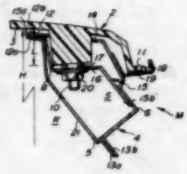


1. An aerodynamically enhanced air grill mountable on an upper, forward portion of a vehicle comprising:
a grill frame mounted on an upper, forwardly disposed portion of the vehicle, the grill frame having a forwardly disposed portion, a first side portion and a spatially disposed second side portion, the grill frame defining therein at least one opening in each of the forwardly disposed portion, the first side portion and the second side portion;
an air intake grill mounted in the opening formed in the forwardly disposed portion of the grill frame, the air intake grill comprising an array of substantially vertically, spatially disposed first air foils for directing air flow toward the openings in the first and second side portions of the grill frame when air impacting the air intake grill is received therethrough;
a first air discharge grill mounted in the opening formed in the first side portion of the grill frame, the first air discharge grill comprising an array of substantially vertically, spatially disposed second air foils adapted to deflect air passing therethrough rearwardly around an adjacently disposed first side of the vehicle; and
a second air discharge grill mounted in the second opening formed in the second side portion of the grill frame, the second air discharge grill comprising an array of substantially vertically, spatially disposed third air foils adapted to deflect air passing therethrough rearwardly around an adjacently disposed second side of the vehicle.

4,957,326
ROOF PANEL MOUNTING STRUCTURE

Koji Chiba, Yokosuka, and Kensuke Uchida, Tokyo, both of Japan, assignors to Nissan Motor, Co. Ltd., Yokohama, Japan

Filed Oct. 11, 1989, Ser. No. 420,072
Claims priority, application Japan, Oct. 26, 1988, 63-270423
Int. Cl.[5] B62D *25/06*
U.S. Cl. 296—210 8 Claims



1. A roof panel mounting structure comprising:
a boss section projected from inner surface of a roof panel of a vehicle body;
a bolt fixedly inserted in said boss section;
a roof rail fixedly disposed under said roof panel and including inner and outer panels which are joined with each other to define a hollow;
means defining an opening in said outer panel, said boss section being disposed in said opening and projected into the hollow of said roof rail; and
a reinforcement member disposed in said roof rail and fixedly connected to at least one of said inner and outer panels of said roof rail, said bolt being fixedly secured to said reinforcement member.

4,957,327
METHODS OF TRANSLATING A FACE SUPPORT

Harry Oppenländer, Wetter, and Heiko Druzela, Recklinghausen, both of Fed. Rep. of Germany, assignors to Klöckner-Becorit GmbH, Fed. Rep. of Germany

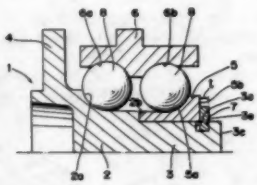
Filed Jul. 19, 1989, Ser. No. 381,840
Claims priority, application Fed. Rep. of Germany, Jul. 20, 1988, 3824522
Int. Cl.[5] E21D *23/14*
U.S. Cl. 299—11 4 Claims

1. A method of translating a face support comprising a plurality of support units initially arranged side-by-side at an initial position, the method comprising:
moving a first pair of alternately positioned support units a predetermined distance from the initial position;
moving a second pair of alternately positioned support units the predetermined distance from the initial position, one of said units of said second pair being positioned between said first pair; and
repeating the preceding moving steps until the entire plurality of support units is moved the predetermined distance from the initial position.

4,957,328
HUB UNIT

Takashi Tsutsui, Osaka, Japan, assignor to Koyo Seiko Co., Ltd., Osaka, Japan

Filed Mar. 15, 1989, Ser. No. 323,782
Claims priority, application Japan, Mar. 18, 1988, 63-37060[U]
Int. Cl.[5] B60B *27/00*
U.S. Cl. 301—105 R 6 Claims



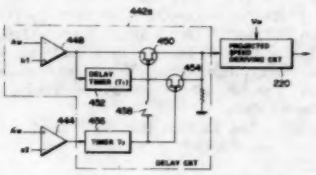
1. A hub unit comprising:
an outer ring member;
an inner ring member including a flange part to which a wheel is to be mounted, a large diameter part, a small diameter part which has an outer circumference channel extending circumferentially in an end thereof and a plurality of notches defined therein which open the outer circumference channel to an end surface of the small diameter part, and a shoulder defined between said large and said small diameter parts;
a sleeve disposed over the small diameter part of the inner ring member, one end of the sleeve contacting said shoulder, and the other end of said sleeve overhanging the outer circumference channel when said sleeve is disposed over said small diameter part with said one end thereof abutting said shoulder;
a plurality rolling elements positioned at regular intervals between the inner circumferential surface of said outer ring member and the outer circumferential surface of said large diameter part of the inner ring member and between the inner circumferential surface of said outer ring member and the outer circumferential surface of said sleeve;
a ring-shaped bayonet member having a plurality of engaging parts which respectively project radially inwardly at positions corresponding to the positions of said notches defined in the inner ring member, each of said engaging parts having a tapered portion, each of said engaging parts being insertable through a respective one of said notches,
said ring-shaped bayonet member having a portion thereof extending between, in a thickness-wise direction thereof, and contacting a surface of said inner ring member defining a side of said circumference channel and ssid other end of said sleeve,
said portion of the ring-shaped bayonet member including a portion of each of said engaging elements which contacts said surface of said ring member defining said side of said circumference channel, and
said portion of the ring-shaped bayonet member having a preassembly thickness greater than the difference between the distance from said shoulder to said surface of said inner ring member defining said side of said circumference channel and the distance from said shoulder to said other end of said sleeve, when said sleeve is disposed over said small diameter part prior to assembly of said bayonet member with said one end thereof abutting said shoulder, such that said bayonet member presses said sleeve against said shoulder and is in turn wedged between said sleeve and said surface defining said side of said circumference channel.

4,957,329

MALFUNCTION PREVENTIVE ANTI-SKID BRAKE CONTROL SYSTEM FOR AUTOMOTIVE BRAKE SYSTEM

Toshiro Matsuda, Sagamihara, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Continuation of Ser. No. 886,759, Jul. 15, 1986, abandoned, which is a continuation of Ser. No. 673,200, Nov. 19, 1984, abandoned. This application Sep. 14, 1988, Ser. No. 244,655
Claims priority, application Japan, Nov. 25, 1983, 58-220542
Int. Cl.[5] B60T *8/02*
U.S. Cl. 303—97 **15 Claims**



1. An anti-skid brake control system for an automotive brake system comprising:

a hydraulic brake system including a wheel cylinder for applying braking pressure to a vehicle wheel, and a pressure control valve associated with said wheel cylinder for adjusting fluid pressure in said wheel cylinder, said pressure control valve being operative to increase fluid pressure in the wheel cylinder in a first position thereof, to hold the braking pressure at one of an increased or decreased level at a second position thereof, and to decrease the braking pressure at a third position thereof;

a wheel speed sensor producing a wheel speed indicative signal having a value indicative of the wheel speed;

a controller deriving a wheel acceleration and other brake control parameters on the basis of the wheel speed indicative signal value, said controller including first means for projecting a projected speed corresponding to a vehicle speed on the basis of said wheel speed indicative signal value at a timing at which wheel acceleration is decreased to a first threshold value, said controller selecting an operational mode of said pressure control valve on the basis of said control parameters including wheel acceleration and the projected speed derived by said first means to produce a control signal to operate said pressure control valve to one of said valve positions, and said controller further including second means for determining overrunning of the wheel speed beyond the vehicle speed by comparing said wheel acceleration with a predetermined overrunning threshold value, to cause a given delay in operation of said first means for deriving said projected speed after said timing at which the wheel acceleration decreases across said first threshold in a subsequent skid control cycle.

4,957,330

BRAKING DEVICE HAVING AN AUTOMATIC FLUID PRESSURE REGULATING FUNCTION

Hirohiko Morikawa, Toyota; Hiroyoshi Kako, Nagoya; Noboru Noguchi, and Nobuyasu Nakanishi, both of Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Feb. 8, 1989, Ser. No. 307,481
Claims priority, application Japan, Feb. 27, 1988, 63-45423
Int. Cl.[5] B60T *8/64*
U.S. Cl. 303—115 **16 Claims**

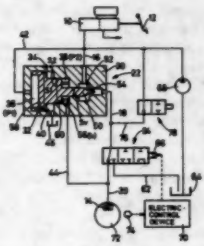
1. A braking device having a function of automatically regulating a pressure of a fluid in a wheel cylinder for applying brake to a wheel of a vehicle, comprising:

a high-pressure hydraulic system including a hydraulic pressure source, and a fluid passage connected to said hydraulic pressure source;

a wheel-cylinder hydraulic system including said wheel cylinder, and a fluid passage connected to said wheel cylinder;

a low-pressure hydraulic system including a reservoir and a fluid passage connected to said reservoir;

a solenoid-operated directional control valve device for fluid communication of said wheel-cylinde, hydraulic system selectively with said high-pressure hydraulic system or said low-pressure hydraulic system;



an electric control device connected to said directional control valve device for controlling the directional control valve device to thereby control the fluid pressure in said wheel cylinder; and

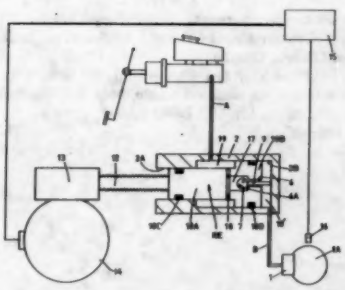
a variable flow restrictor device disposed in said fluid passage of said high-pressure hydraulic system, for decreasing a rate of flow of the fluid through said fluid passage of the high-pressure hydraulic system, with an increase in a pressure difference between said high-pressure and wheel-cylinder hydraulic systems, and with an increase in a pressure in said wheel-cylinder hydraulic system.

4,957,331

HYDRAULIC ANTI-SKID VEHICLE BRAKING SYSTEM

Robert T. Burton, Leamington Spa, and Phillip A. Taft, Solihull, both of Great Britain, assignors to Lucas Industries Public Limited Company, Brimingham, England

Continuation of Ser. No. 210,858, Jun. 24, 1988, abandoned. This application Jun. 15, 1989, Ser. No. 366,363
Claims priority, application United Kingdom, Jun. 27, 1987, 8715129
Int. Cl.[5] B60T *8/58, 8/46*
U.S. Cl. 303—115 **11 Claims**



1. A hydraulic vehicle anti-skid braking system comprising:

a wheel brake actuator means;

a primary fluid pressure source;

fluid pressure conduit means connecting said primary fluid pressure source to said brake actuator means for operating

said brake actuator means by fluid pressure from said fluid pressure source;

skid sensing means for detecting an incipient skid condition of the wheel and emitting a signal in response thereto during running of the wheel;

modulator means operatively connected in said conduit means for controlling the application of fluid pressure from said fluid pressure source to said actuator, said modulator means comprising,

a modulator housing,

a cylinder in said housing having a larger diameter section and a smaller diameter section,

a piston operatively mounted in said cylinder for reciprocating movement, said piston having a larger diameter section and a smaller diameter section corresponding to said larger and smaller diameter sections of said cylinder, respectively,

a first variable volume chamber defined between one side of said piston and said cylinder, a part of said conduit means being connected between said first variable volume chamber and said brake actuator means,

a second chamber connected to said source of fluid pressure by another part of said conduit means and defined between a fixed end wall and cylindrical wall of said cylinder and the other side of said piston spaced from said fixed end wall, said piston having a first area subject to fluid pressure in said first chamber and a second area subject to fluid pressure in said second chamber,

valve means operatively disposed between said fluid pressure source and said brake actuator means, and

valve operating means responsive to operation of said stepper motor for operating said valve means between an open position and a closed position;

a stepper motor operatively connected to said sensing means for receiving said signal therefrom for operating said stepper motor thereby; and

a reversible screw thread mechanism operatively connected to said stepper motor for operation by rotation of said stepper motor, and operatively connected to said piston for reciprocating said piston to vary the volumes in said chambers so that movement of said piston outwardly of said first chamber increases the volume of said first chamber and thereby relieves fluid pressure on said brake actuating means, said stepper motor operates to return said piston to a normal operating position when no skid-condition is detected by said skid sensing means, and in the event of failure of said stepper motor when said valve means is in said closed position said piston is permitted by said reversible thread to move by pressure on said second area to open said valve means.

4,957,332

TRACK WHEEL

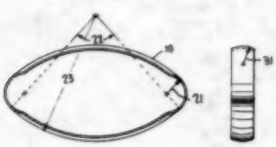
Joost Batelaan, Scarborough, Canada, assignor to National Research Council Canada/Conseil National de Recherches Canada, Ottawa, Canada

Filed May 4, 1989, Ser. No. 347,008

Claims priority, application Canada, May 5, 1988, 566876

Int. Cl.[5] B62D *55/18*

U.S. Cl. 305—39 **6 Claims**



1. A self supporting track for mounting on a pair of load bearing rollers, said track comprising a continuous resilient band having longitudinal curvature limiting means for resisting flattening beyond a predetermined maximum radius under load, but substantially free to bend to a smaller radius of curvature for passage around said rollers, said longitudinal curvature limiting means being defined by a preformed longitudinal and transverse curvature whereby the unmounted track defines two opposite large radius arc portions and two smaller radius arc portions, said large radius arc portions between the rollers defining an arc of between 15 to 120 degrees, in an unloaded condition.

4,957,333

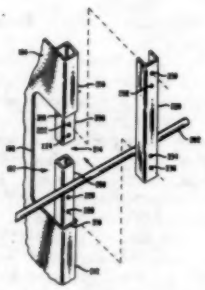
CABLE CARRYING METHOD AND APPARATUS FOR MODULAR COMPUTER CABINETS AND THE LIKE

Sawyer C-Y. Hsu; Carlo V. Daleo, both of San Diego; Sidney L. Valentine, Poway; James Fratis, San Diego, and Robert W. Fischer, Jr., Lakeside, all of Calif., assignors to NCR Corporation, Dayton, Ohio

Filed Jun. 23, 1989, Ser. No. 370,944

Int. Cl.[5] A47B *87/00*

U.S. Cl. 312—108 **8 Claims**



1. A computer cabinet comprising:

a plurality of end walls, at least one of which has a notch at a first edge of said end wall, said notch for receiving interconnect cables which span through planes projected by said end walls;

a closure member corresponding to each said notch for closing said notch to prevent cable ingress or egress through said notch, but not preventing the extension of interconnect cables through said notch and through the projected planes of said end walls; and

structural members spanningly coupled to said first edges, but not completely covering said notch;

said closure members removably coupled to said structural members.

4,957,334

INTERLOCK SYSTEM

Matthew L. Lakso, Westminster, Mass., assignor to Priority Mfg. Corp., Leominster, Mass.

Filed Nov. 1, 1988, Ser. No. 265,594

Int. Cl.[5] E05C *7/06*

U.S. Cl. 312—221 **13 Claims**

1. An interlock system for a cabinet having a plurality of drawers which are each movable ralative to the cabinet between an open position and a closed position, said locking system comprising:

(a) a latching module for each of said drawers which are arranged in a vertical series in the cabinet, each of said latching modules having:

(1) a supporting base which is fixed to the cabinet,

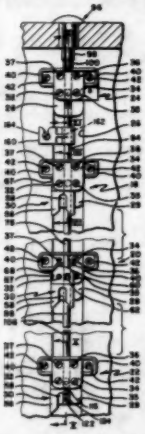
(2) a first passageway which has a first vertical axis and

which has an opening facing each adjacent latching module,

(3) a second passageway which intersects said first passageway and which has a second longitudinal axis which is transverse to said first longitudinal axis, said second passageway having an inner opening at said first passageway and an outer opening, and

(4) a first transmitter which is positioned in said second passageway for movement along said second axis, said first transmitter having a first end which has a first end surface at the inner opening of said second passageway and an opposite second end which has a second end surface at the outer opening of said second passageway, said first end surface being at an acute angle to said second axis and to said first axis,

(b) a plurality of vertical elongated second transmitters, each of said second transmitters having an upper end which is slidable in the first passageway of the upper one of two adjacent latching modules and a lower end which is slidable in the first passageway of the lower one of said two adjacent latching modules, said upper end having an upper end surface which is at an acute angle to said first axis and to the second axis of the upper one of said two adjacent latching modules, said lower end surface lying at the inner opening of the second passageway of the upper



one of said two adjacent latching modules, said lower end having a lower end surface which is at an acute angle to said first axis and to the second axis of the lower one of said two adjacent latching modules, said lower end surface lying at the inner opening of the second passageway of the lower one of said two adjacent latching modules,

(c) biasing means for urging said second transmitters upwardly and downwardly so that for each two adjacent second transmitters, the lower end of the upper of said two adjacent second transmitter abuts the upper end of the lower of said two adjacent second transmitters for yieldably maintaining the upper and lower end surfaces of the respective upper and lower second transmitters of said two adjacent second transmitters at the inner opening of the second passageway of the latching module within which said two adjacent second transmitters meet,

(d) an actuating lever for each of said latching modules which is pivotally mounted on the supporting base for movement between a non-actuating position and an actuating position, said actuating lever being effective to engage the second end of the corresponding first transmitter and to move the corresponding first transmitter along the second axis of its respective second passageway toward said first axis for engaging each top and bottom end surface which is at the inner opening of the latching module and for displacing each second transmitter which corresponds to an end surface which is engaged by the first transmitter along said first axis toward the adjacent latching module into which said displaced second transmitter extends so that said displaced second transmitter blocks the inner opening of the second passageway of said adjacent latching module, thereby preventing the first transmitter of said adjacent latching module from moving toward said first axis and for preventing the corresponding actuating lever of said adjacent latching module from moving to its actuating position, and

(e) a transfer element for each drawer, each transfer element being fixed to its corresponding drawer, and being operatively connected to the actuating lever for its corresponding latching module for moving the corresponding actuating lever from its non-actuating position to its actuating position upon movement of the drawer from its closed position to its open position, provided that the corresponding actuating lever is not prevented from moving toward its actuating position, so that when one drawer of said cabinet is in the open position, the other drawers are prevented from being opened.

4,957,335

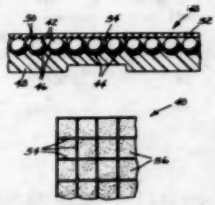
MICROSPHERE-BASED RETROREFLECTIVE ARTICLES WITH ENHANCED RETROREFLECTIVE BRIGHTNESS

Clark G. Kuney, Jr., Hudson, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 26, 1989, Ser. No. 358,442

Int. Cl.[5] G02B *5/128, 5/136*

U.S. Cl. 350—105 **38 Claims**



1. A microsphere-based retroreflective article comprising transparent microspheres having reflectors in optical association with the rear surfaces thereof, wherein said microspheres are air-incident, and have an average refractive index of at least about 1.915 and an average diameter of at least about 75 microns, said average refractive index and said average diameter also corresponding to the coordinates of a point within region D of FIG. 5, and wherein said microspheres have a diameter percent range of about 30 percent or less.

4,957,336

LASER BEAM SCANNER AND ITS FABRICATING METHOD

Shin-ya Hasegawa, Machida; Masayuki Kato, Atsugi; Fumio Yamagishi, Ebina; Hiroyuki Ikeda, Yokohama, and Takefumi Inagaki, Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 890,619, Jul. 30, 1986, abandoned. This application Nov. 10, 1988, Ser. No. 269,412

Claims priority, application Japan, Jul. 31, 1985, 60-168830; Jan. 25, 1986, 61-14445; Mar. 20, 1986, 61-60826; Mar. 20, 1986, 61-60833; Mar. 20, 1986, 61-60845; Mar. 20, 1986, 61-60846

Int. Cl.[5] G02B *5/32, 26/10*

U.S. Cl. 350—3.71 **29 Claims**

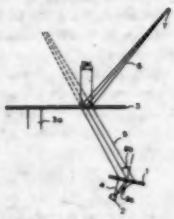
1. A laser beam scanner apparatus comprising:

a beam source for generating a semiconductor laser beam having a first wavelength;

a rotary hologram with variable spatial frequency for diffracting said semiconductor laser beam to form a scanning beam on a surface to be scanned;

a light source and lens for generating a spherical object wave having an aberration and a second wavelength shorter than said first wavelength; and

an aberration correcting stationary hologram formed on a stationary hologram substrate by construction beams having a wavelength shorter than a reconstruction beam, said aberration correcting stationary hologram being disposed between said beam source and said rotary hologram



and said construction beam including the object wave, which is inclined at a non-vertical angle with respect to the stationary hologram substrate, and a reference wave which interfere on the stationary hologram substrate, so that the laser beam diffracted through said aberration correcting stationary hologram, in which a wave having a predetermined aberration is recorded, has a predetermined aberration by which an aberration of said scanning beam on the surface to be scanned shall be corrected, wherein said semiconductor laser beam diverged from said beam source irradiates said stationary hologram directly, and

wherein said reference wave is a spherical wave having a required aberration.

4,957,337

OPTICAL QUANTUM INTERFERENCE DEVICE AND METHOD OF MODULATING LIGHT USING SAME

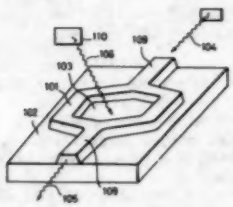
Kensuke Ogawa, Hachioji; Toshio Katsuyama, Ome, and Tadashi Fukuzawa, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 5, 1989, Ser. No. 348,216

Claims priority, application Japan, May 6, 1988, 63-108993; May 25, 1988, 63-125711; Jul. 13, 1988, 63-172706

Int. Cl.[5] G02B *6/10, 5/30;* **G01B** *9/02;* **H01J** *5/16*

U.S. Cl. 350—96.13 **31 Claims**



1. An optical quantum interference device comprising:

a light source emitting light to be modulated;

a waveguide region, having a first quantum state formed by an electron and other particle state, propagating the light to be modulated therethrough to couple with the first quantum state forming a second quantum state and conserving therein the coherency of the second quantum state;

means for interacting with the second quantum state to apply to said second quantum state a physical quantity to change a phase of a wavefunction of said second quantum state; and

means for producing as an output a change in the phase of the wavefunction of said second quantum state caused by the interaction as a change in the intensity of the light subjected to the interaction thereby causing the light to be modulated.

16. A method for modulating light in an optical quantum interference device comprising the steps of: receiving light to be modulated, shifting the phase of a wavefunction of the quantum state formed by the interaction of the light to be modulated and an electron to cause an interference of the quantum state, and detecting the interference as a change in the intensity of the modulated light.

4,957,338

FABRICATION OF FIBRE OPTIC COMPONENTS

David A. Thorncraft, Isabella Plains; David R. Kennedy, Kambah; Scott C. Rashleigh, Wanniassa, and Timothy P. Dabbs, Eastwood, all of Australia, assignors to The Commonwealth of Australia, Australia

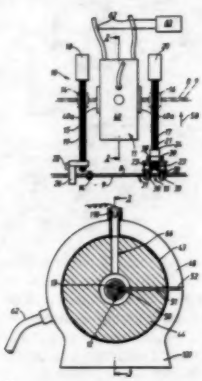
PCT No. PCT/AU87/00380, § 371 Date Sep. 12, 1988, § 102(e) Date Sep. 12, 1988, PCT Pub. No. WO88/03661, PCT Pub. Date May 19, 1988

PCT Filed Nov. 9, 1987, Ser. No. 259,118

Claims priority, application Australia, Nov. 14, 1986, PH8981/86

Int. Cl.[5] G02B *6/26*

U.S. Cl. 350—96.15 **17 Claims**



15. Apparatus for fabricating a fused fibre optic coupler, comprising:

means for disposing two or more segments of optical fibre under longitudinal tension;

means for heating said tensioned fibre segments;

means for monitoring the longitudinal tension and temperature of each of said segments, directly or indirectly; and

control means responsive to said monitoring means and controlling said heating means which control means is arranged whereby, when the tension in the segments falls to a predetermined threshold value, the heating means continues to raise the temperature of the segments a predetermined number of degrees above their temperature when their tension falls to said threshold value, to a temperature sufficient to cause the fibre segments to fuse together.

4,957,339

OPTICAL COMMUNICATION SYSTEM, PARTICULARLY IN THE SUBSCRIBER AREA

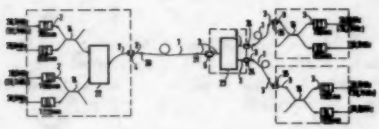
Kurt Fussganger, Remseck, and Heinz G. Krimmel, Stuttgart, both of Fed. Rep. of Germany, assignors to Alcatel N.V., Amsterdam, Netherlands

Filed Jun. 7, 1989, Ser. No. 363,551

Claims priority, application Fed. Rep. of Germany, Jun. 8, 1988, 3819445

Int. Cl.[5] G02B 6/26

U.S. Cl. 350—96.15 15 Claims



12. Bidirectional optical communication system usable with short wavelength optical signals having predetermined wavelengths, said system comprising:

an optical waveguide transmission link comprising a waveguide having an associated cutoff wavelength above which only the fundamental mode of an optical signal can propagate, said cutoff wavelength being above said predetermined wavelengths,

a first optical transmitter disposed at a first end of the transmission link for transmitting a first said short wavelength optical signal having a first said predetermined wavelength,

a first optical receiver disposed at a second end of the transmission link for receiving said first optical signal,

a second optical transmitter disposed at the second end of the transmission link for transmitting a second said short wavelength optical signal having a second said predetermined wavelength different from said first predetermined wavelength,

a second optical receiver disposed at the first end of the transmission link for receiving said second optical signal,

means for transmitting signals in a first direction from said first optical transmitter to said first optical receiver and in a second direction from said second optical transmitter to said second optical receiver using wavelength-division multiplexing, and

first and second mode filters respectively disposed at said first and second ends of the transmission link for attenuating higher-order modes other than said fundamental mode, each said mode filter comprising

four short wavelength waveguide sections each having an associated cutoff wavelength which is below said predetermined wavelengths, whereby each said short wavelength waveguide section functions as a single-mode optical waveguide at said predetermined wavelengths,

a fusion splice for permanently coupling a first end of a first said short wavelength waveguide section to said waveguide,

a wavelength-selective coupler for connecting a fourth said short wavelength waveguide section with said second and third said short wavelength waveguide sections, and

an optical connector for removably connecting a second end of the first section to an adjacent first end of the fourth section, whereby the transmission link may be removably connected to the optical transmitters and optical receivers disposed coupled to a particular end thereof,

wherein

one transmitter-receiver pair has an operating wavelength different from that of the other transmitter-receiver pair, and

any other optical connectors or optical couplers are located between short wavelength optical waveguide sections which have a cutoff wavelength below said predetermined wavelengths.

4,957,340

SYNCHRONOUS MULTIFREQUENCY OPTICAL NETWORK

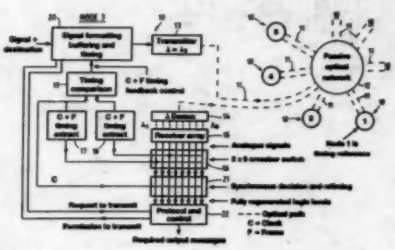
Paul A. Kirkby, Old Harlow, Great Britain, assignor to STC PLC, London, England

Filed Nov. 6, 1989, Ser. No. 432,574

Claims priority, application United Kingdom, Nov. 8, 1988, 8826156

Int. Cl.[5] G02B 6/28; H04J 1/00, 3/00; G02F 1/00

U.S. Cl. 350—96.16 9 Claims



1. A multi wavelength optical network comprising a plurality of nodes interconnected via a single common passive optical coupler wherein all signals transmitted over the network are synchronous at the coupler, each node receiving signals from all the nodes and each node including wavelength demultiplexing means.

4,957,341

INTEGRAL TYPE LENS

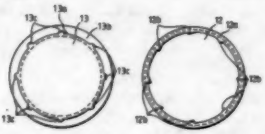
Shinichi Hasegawa, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jun. 7, 1989, Ser. No. 363,580

Claims priority, application Japan, Oct. 6, 1988, 63-130398[U]

Int. Cl.[5] G02B 7/02

U.S. Cl. 350—254 6 Claims



1. An integral type lens composed of a first lens having a rim in the outer circumference thereof and a second lens disposed within the rim of this first lens and having an outside face which faces an inside face of said rim, said integral type lens comprising:

a plurality of guide projections positioned on one of said inside face and said outside face, each said guide projections having a slanting surface inclined with respect to a plane tangent to the said face on which said guide projections are positioned; and

a plurality of contact pieces positioned on the other of said inner face and said outside face;

said contact pieces engaging respective ones of said guide

projection slanting surfaces to conform the optical axes of said first and second lenses.

4,957,342

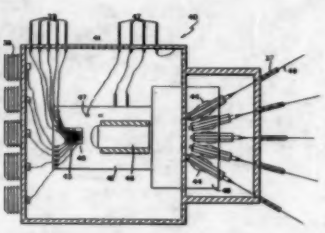
SINGLE-MODE OPTICAL FIBER ARRAY PACKAGE FOR OPTOELECTRONIC COMPONENTS

Robert A. Boudreau, Hampton, N.H., and William C. Rideout, Townsend, Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Continuation-in-part of Ser. No. 439,761, Nov. 20, 1989. This application Nov. 30, 1989, Ser. No. 444,500

Int. Cl.[5] G02B *6/32, 6/36*

U.S. Cl. 350—96.18 **49 Claims**



1. A package for an optoelectronic array device having an array of optoelectronic active elements enclosed in a housing and secured to a substrate carrier having a solderable surface within said housing, said active elements optically coupled to an array of uptapered single-mode optical fibers connecting said optoelectronic array device to an external device, comprising:

a graded index lens, having a numerical aperture sufficient to access optically said active elements and having a curvature on one end closest to said optoelectronic array, secured to said substrate a fixed distance from said optoelectronic array of active elements to yield an appropriate magnification of the light beams emanating from said active elements; and

said array of uptapered single-mode optical fibers extending from within said housing to the exterior of said housing through a port thereof, said optical fibers being positioned by active alignment and secured to said substrate such that the uptapered end of each of said optical fibers is optically coupled through said lens to a respective one of said active elements of said optoelectronic array and the opposite end of said optical fiber is outside said housing, and such that each optical fiber is spatially aligned at its uptapered end to a respective one of the magnified light beams.

4,957,343

METHOD FOR SPLICING OPTICAL FIBERS HAVING A PLASTIC CLAD LAYER AND AN OPTICAL FIBER SUITED FOR CARRYING OUT THE METHOD

Tsugao Sato, and Kenichi Komura, both of Tokyo, Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Oct. 30, 1989, Ser. No. 428,880

Int. Cl.[5] G02B *6/38, 6/02*

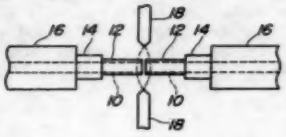
U.S. Cl. 350—96.21 **18 Claims**

1. A method for splicing optical fibers having a clad layer made of a plastic material, comprising the steps of:

(a) preparing an optical fiber having a clad layer and a sheath coated in sequence around a core thereof, said clad layer being made of such a resin that a residuum thereof after pyrolysis due to a thermogravimetric analysis is smaller than a predetermined amount;

(b) removing the sheath at an end portion of the optical fiber, to expose the clad layer, and treating the end face of the core at the end portion of the optical fiber;

(c) aligning axes of two optical fibers, end portions of which have been treated in said step (b), such that the treated end faces of the cores of the two optical fibers are opposed and close to each other; and



(d) heating said end portions of the two optical fibers by electrical discharge, to remove the exposed clad layer by pyrolysis and fusion bond the opposed end faces of the cores to each other.

4,957,344

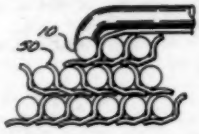
OPTICAL FIBER TAPE ASSEMBLY AND CANISTER

Ronald B. Chesler, Woodland Hills, Calif., and George W. LeCompte, Tucson, Ariz., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Apr. 18, 1989, Ser. No. 339,754

Int. Cl.[5] G02B *6/44*; B65H *75/20, 18/28, 55/04*

U.S. Cl. 350—96.23 **15 Claims**



1. An improved optical fiber assembly for selectively winding, storing and unwinding an optical fiber, comprising:

an optical fiber windable into a plurality of side-by-side turns; and

flexible support means joined to said optical fiber and extendable between side-by-side turns for contacting and maintaining said turns in side-by-side relationship during storage and unwinding of said optical fiber.

4,957,345

LIGHT ENERGY TRANSMITTING OPTICAL FIBER CABLE

Yoichi Sakuma, Kawasaki, and Chieko Umezawa, Yokohama, both of Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan

Filed Sep. 8, 1989, Ser. No. 404,632

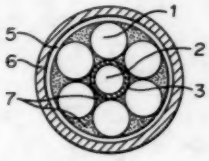
Claims priority, application Japan, Sep. 30, 1988, 63-127089[U]; Apr. 27, 1989, 1-48347[U]

Int. Cl.[5] G02B *6/44*

U.S. Cl. 350—96.23 **7 Claims**

1. A light energy transmitting optical fiber cable, comprising in its cross-sectional structure, a high tensile strength wire coated with a fire-retardant resin, as a core material, at least one resin-clad glass core optical fiber disposed around the core

material, a highly heat conductive material covering the optical fibers, and a fire-retardant resin covering the heat conductive material so that cable has high fire-retardant characteristics.

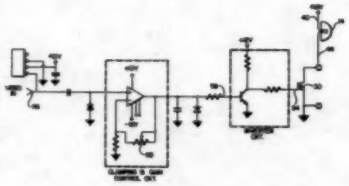


4,957,346

ILLUMINATION SYSTEM FOR PORTABLE COLOR IMAGER BORESCOPE

Robert J. Wood; Earl H. Slee, both of Syracuse; Gregory E. Pasik, Auburn, and Michael J. Pileski, Warners, all of N.Y., assignors to Welch Allyn, Inc., Skaneateles Falls, N.Y.

Filed Oct. 6, 1989, Ser. No. 417,555
Int. Cl.[5] G02B *23/26*
U.S. Cl. 350—96.26 **9 Claims**



1. In a borescope/endoscope of the type having an elongated insertion tube with a solid state image sensor in a viewing head at the distal end, a fiber optic cable extending from the distal end to the proximal end, and a control processor module at the proximal end, illumination means comprising:

lamp means operatively positioned adjacent the proximal end of the fiber optic cable for transmitting light therethrough to the object to be viewed;

a source of operating voltage for energizing said lamp means;

control circuit means connected between said lamp means and said operating voltage source;

video signal transmitting means connected between the viewing head and said control circuit means;

said control circuit means being arranged to connect and disconnect said operating voltage and said lamp means at a video frequency rate in accordance with the video signal picked up by said viewing head;

so that as the video signal decreases, the lamp is energized longer and vice-versa.

4,957,347

CLAD OPTICAL CONDUIT AND METHOD OF MANUFACTURE

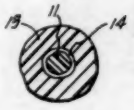
Jamshid Zarian, Woodland Hills, Calif., assignor to Lumenyte International Corporation, Chatsworth, Calif.

Filed Jan. 30, 1989, Ser. No. 304,417
Int. Cl.[5] G02B *6/20*
U.S. Cl. 350—96.32 **11 Claims**

1. A flexible, clad monofilament conduit comprising:

a cylindrical, flexible polymeric core having a relatively high refractive index;

a tubular, flexible, cladding surrounding the core; and



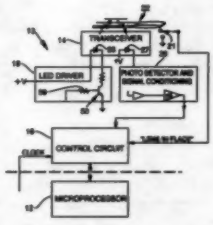
means for establishing a relatively narrow and substantially uniform gap containing air between the outer periphery of the core and the inner periphery of the cladding.

4,957,348

OPTICAL TRANSCEIVER WITH MULTIPLE COMMUNICATION MODES

Gregory J. May, Corvallis, Oreg., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 21, 1989, Ser. No. 327,229
Int. Cl.[5] G02B *27/00*
U.S. Cl. 350—321 **12 Claims**



12. An apparatus, comprising:

a computing device;

an optical transceiver mounted to the computing device;

focusing means mounted to the computing device for adjusting the focal distance of the optical transceiver;

processing means arranged within the computing device for implementing a plurality of communication modes of the optical transceiver, said processing means selecting a communication mode corresponding to the focal distance adjusted for by the focusing means; and

control circuit means arranged within the computing device to be coupled to the optical transceiver and the processing means for transmitting data therebetween,

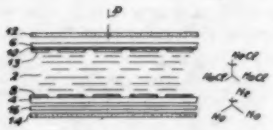
said control circuit means enabling the optical transceiver in a first communication mode to read bar codes and transmit the read bar code data to said processing means and enabling the optical transceiver in a second communication mode to communicate data with modulated light and transmit the data to and receive the data from the processing means.

4,957,349

ACTIVE MATRIX SCREEN FOR THE COLOR DISPLAY OF TELEVISION PICTURES, CONTROL SYSTEM AND PROCESS FOR PRODUCING SAID SCREEN

Jean-Frédéric Clerc, Saint Egreve, and Jean-Claude Deutsch, Grenoble, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Mar. 21, 1988, Ser. No. 170,848
Claims priority, application France, Apr. 6, 1987, 87 04820
Int. Cl.[5] G02F 1/13
U.S. Cl. 350—333 8 Claims



5. In combination:

active matrix screen for the color display of television pictures, said screen comprising: an assembly having a liquid crystal layer of a substantially constant thickness and disposed between an active matrix having transparent control electrodes and a transparent counterelectrode provided with colored filters, respectively associated with the control electrodes and two polarizing means on either side of said assembly, wherein said screen utilizes the electrically controlled birefringence effect, the liquid crystal layer being of the nematic type and having a positive optical anistropy and a negative dielectric anisotropy, the molecules of said layer being substantially oriented in a homeotropy direction, in the absence of an electrical voltage between the control electrodes and the counterelectrode, wherein the product of the thickness of the liquid crystal layer by the NeCL—NoCL difference between the extraordinary index and ordinary index of said layer is at the most equal to approximately 0.6 micrometer and wherein the two polarizing means are complementary to one another;

and a control system for the control of said screen, said system incorporating amplification means for respectively amplifying blue, green and red chrominance signals provided for the formation of said pictures, each amplification means being provided with an amplification gain regulation or control, which is regulatable so as to effect a display of neutral white shade on the screen.

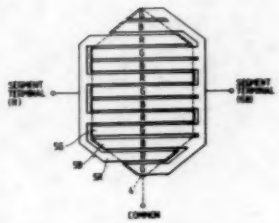
4,957,350

LIQUID CRYSTAL DISPLAY DEVICE

Hiroshi Ito; Masaru Kugo, and Michiaki Kurosawa, all of Ibaraki, Japan, assignors to Hitachi, Ltd, Tokyo and Hitachi Automotive Engineering, Ibaraki, both of, Japan

Filed Nov. 22, 1988, Ser. No. 274,833
Claims priority, application Japan, Nov. 24, 1987, 62-294110
Int. Cl.[5] G02F 1/133
U.S. Cl. 350—336 4 Claims

1. A liquid crystal color display element comprising a common electrode, striped red, green and blue color filters and comb electrodes opposing to said common electrode through said red, green and blue color filters, respectively, at least two



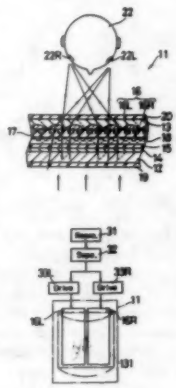
of said comb electrodes being connected in parallel and interleaved with the remaining comb electrode.

4,957,351

STEREO IMAGE DISPLAY DEVICE

Mitsuaki Shioji, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed May 5, 1989, Ser. No. 347,764
Claims priority, application Japan, May 10, 1988, 63-113806
Int. Cl.[5] G02F 1/13
U.S. Cl. 350—348 9 Claims



1. A stereo display device, having a display unit, comprising:

a pair of substrates;

a pattern of electrodes being formed on each substrate;

a material filled in a space between said substrates having an electrically controllable optical characteristic for effectuating a display when a voltage is selectively applied to said electrodes on said substrates;

at least one of said substrates confronting a viewer being a transparent substrate; and

plural optical means for refracting rays of light incident thereupon so that the rays of light travel in different directions determined by a position of the incidence of such rays of light;

said transparent substrate having each optical means formed therein;

said pattern of electrodes on said transparent substrate having a plurality of pairs of display electrode elements, each pair of display electrode elements having a single display electrode element associated with a left eye of a viewer and a single display electrode element associated with a right eye of a viewer;

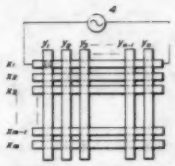
each said optical means being formed on said transparent substrate such that each said optical means is positioned contiguously to each said pair of display electrode elements.

4,957,352

ELECTROCHROMIC DISPLAY DEVICE

Akio Yasuda, Tokyo, and Kengo Ito, Kanagawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jul. 27, 1988, Ser. No. 224,813
Claims priority, application Japan, Jul. 29, 1987, 62-189451
Int. Cl.[5] G02F *1/01*; G09G *3/34*
U.S. Cl. 350—353 6 Claims



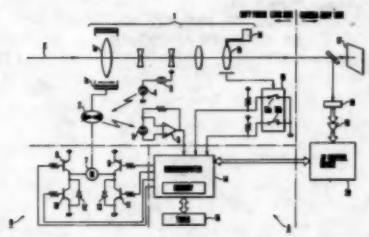
1. An electrochromic display comprising an electrochromic material layer provided between a pair of plates, at least one of said plates being transparent, said electrochromic material layer composed of a coloring compound and a supporting electrolyte means for heating said electrochromic material layer to liquefy said electrochromic material layer to convert the layer into electrical conduction and means for applying a current to said material layer to cause oxidation and/or reduction reaction of said coloring compound when the electrochromatic layer is in a liquified condition.

4,957,354

OPTICAL APPARATUS FOR PRODUCING A SPECIAL PHOTOGRAPHIC EFFECT

Shinichi Matsuyama, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 25, 1988, Ser. No. 262,351
Claims priority, application Japan, Oct. 29, 1987, 62-274401
Int. Cl.[5] G02B *7/28*
U.S. Cl. 350—431 16 Claims



1. An optical apparatus for producing a special photographic effect, comprising:

an optical assembly having (1) a movable lens component arranged to move along an optical axis to produce a special photographic effect, and (2) a focusing lens component axially movable for focusing;

a driver for driving said focusing lens component in an axial direction;

a detecting device for detecting the axial position of said focusing lens component to output positional information

a mode selecting device for selecting a normal photographic mode or a special photographic effect mode, said special photographic mode being effected by moving said movable lens component in the axial direction, said mode selection means providing the output signal corresponding to the amount of movement of said movable lens component; and

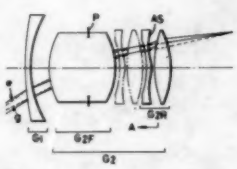
a signal forming device for forming a compensation signal for driving said driver to move said focusing lens component by a distance necessary to compensate for a focus error of said optical assembly resulting from movement of said movable lens component on the basis of said signal corresponding to the amount of movement of said movable lens component and said positional information.

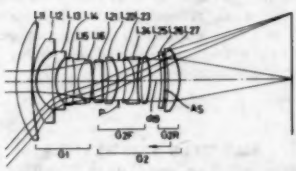
4,957,355

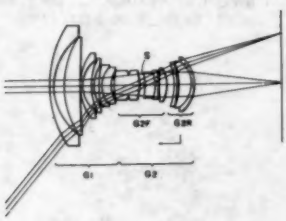
RETROFOCUS TYPE LENS SYSTEM

Haruo Sato, Kawaguchi, Japan, assignor to Nikor Corp., Japan

Continuation-in-part of Ser. No. 133,726, Dec. 16, 1987, abandoned. This application Mar. 17, 1989, Ser. No. 325,088
Claims priority, application Japan, Dec. 24, 1986, 61-313854; Dec. 25, 1986, 61-309685; Jun. 14, 1988, 63-146011; Jun. 20, 1988, 63-151585
Int. Cl.[5] G02B *13/04, 13/18*
U.S. Cl. 350—432 11 Claims







1. A retrofocus type lens system comprising, in the order named from an object side:

a first lens group having a negative refracting power; and

a second lens group having a positive refracting power, said second lens group being constituted by a front group having a positive refracting power and a rear group which has a positive refracting power and is movable along an optical axis to perform focusing;

said rear group having an aspherical surface, said aspherical

surface having a shape in which a negative surface refracting power is increased from a lens vertex to a periphery thereof, so that said aspherical surface corrects variations in coma and curvature of field when said rear group is moved to perform close distance focusing, said negative surface refracting power being defined as a difference between an incident angle and an exit angle of an arbitrary ray incident on an arbitrary point of a refracting surface.

4,957,356

FINDER DEVICE

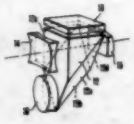
Kouji Oizumi, and Takashi Matsushita, both of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 12, 1988, Ser. No. 180,451

Claims priority, application Japan, Apr. 20, 1987, 62-097188; Apr. 20, 1987, 62-059644[U]; Apr. 20, 1987, 62-059645[U]; Aug. 21, 1987, 62-208610; Aug. 21, 1987, 62-127880[U]; Aug. 21, 1987, 62-127881[U]; Aug. 21, 1987, 62-127882[U]; Aug. 21, 1987, 62-127883[U]

Int. Cl.[5] C02B *17/00*

U.S. Cl. 350—574 12 Claims



1. A finder device comprising:

a first lens means for waist level viewing having a positive refractive power;

a second lens means for eye level viewing; and

a prismatic unit having roof faces with a crest line formed therebetween for relfecting a first light beam passed through said first lens means, and a region permitting a second light beam passed through said second lens means to transmit thereacross.

4,957,357

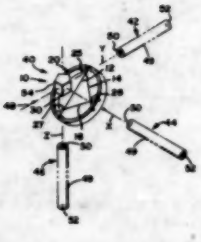
MULTIPLE AXIS RETICLE

Chris E. Barns, Mt. View, and William D. Gunter, San Jose, both of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Oct. 6, 1989, Ser. No. 418,374

Int. Cl.[5] G02B *23/00*; F41G *11/00*

U.S. Cl. 350—576 19 Claims



1. A three-axis reticle comprising a frame having an axis, three straight filaments supported by said frame, each filament occupying a different orthogonal plane, and said filaments arranged to form, as viewed along the frame axis, a triangle with a V extending from each triangle vertex.

4,957,358

ANTIFOGGING FILM AND OPTICAL ELEMENT USING THE SAME

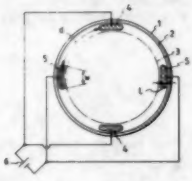
Junji Terada, Tokyo, and Takeshi Sekiguchi, Yokohama, both of Japan, assignors to Canon Kabushiki Kaishi, Tokyo, Japan

Filed Jan. 17, 1989, Ser. No. 297,349

Claims priority, application Japan, Jan. 19, 1988, 63-008665; Jan. 26, 1988, 63-016201; Jan. 26, 1988, 63-016203

Int. Cl.[5] G02B *1/10*

U.S. Cl. 350—588 6 Claims



4. A photographing device for preventing a photographing lens having a plurality of lenses with optical power from fogging, comprising:

a transparent electrically conductive film provided on a circular area of a surface of one of said lenses;

at least a pair of electrodes provided along the edge of said circular area, wherein the following condition is satisfied:

$$1/10 \cdot R \leqq \omega \leqq 1/3 \pi \cdot R$$

$$\omega \leqq d \leqq 13\ \omega$$

where R is a radius of said circular area, ω is the arcuate length of each electrode, and d is a distance between the electrodes;

a dielectric substance layer provided on said circular area for constituting a reflection preventing film; and

means for supplying an electric current to said a pair of electrodes.

4,957,359

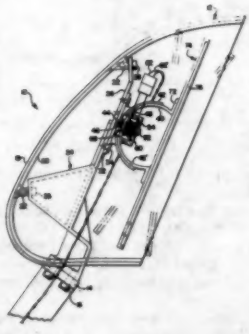
SPRING BIASED MIRROR ASSEMBLY WITH ELECTROMAGNETIC RELEASE MEANS

James W. Kruse, New Haven, and Donald E. Riley, Ft. Wayne, both of Ind., assignors to Navistar International Transportation Corp., Chicago, Ill.

Filed Apr. 19, 1989, Ser. No. 340,327

Int. Cl.[5] B60R *1/06*; G02B *5/08*

U.S. Cl. 350—637 11 Claims



1. A mirror assembly comprising a housing opening at one end thereof, a support structure within said housing, a mirror

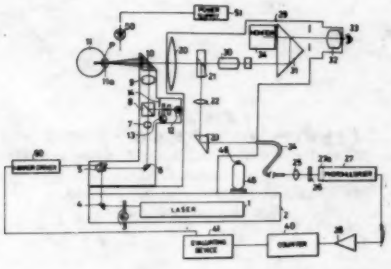
disposed within said housing, said mirror having a reflective surface facing outwardly of said housing, mounting means within said housing for mounting said mirror to said support structure, means fixing the orientation of said mirror, adjusting means secured between said support structure and said mirror for selectively changing the orientation of said mirror, said mounting means including a pair of nested arcuate elements arranged for movement one relative to the other, said mirror being mounted on one of said nested arcuate elements, said fixing means comprising resiliently biased clamping means arranged for immobilizing said pair of nested arcuate elements, said clamping means including a clamping element and resilient biasing means arranged to bear against said clamping element, and said adjusting means comprising an electromagnet operatively engaging said resilient biasing means, a source of electrical power, and switch means between said electromagnet and said source of electrical power for selectively energizing and deenergizing said electromagnet, said electromagnet when energized reducing the clamping force normally effected by said resilient biasing means between said nested arcuate elements an amount sufficient to permit limited movement of one of nested arcuate elements to enable change in the orientation of said mirror and when deenergized maintaining said mirror in an effectively locked orientation.

4,957,360

OPHTHALMIC DISEASE DETECTION APPARATUS

Koichiro Kakizawa, Okazaki, and Tadashi Ichihashi, Hino, both of Japan, assignors to Kowa Company Ltd., Japan

Continuation of Ser. No. 926,650, Nov. 3, 1986, abandoned. This application Apr. 14, 1989, Ser. No. 338,466
Claims priority, application Japan, Nov. 21, 1985, 60-259772
Int. Cl.[5] A61B *3/10*
U.S. Cl. 351—221 **6 Claims**



1. An apparatus for detecting ophthalmic diseases in the camera oculi of a patient's eye which contains protein due to inflammation, comprising:

a laser source for producing a laser beam;

means for focussing the laser beam at a selected spot in the camera oculi of the patient's eye such that the focussed laser beam is scattered by the protein in the camera oculi during a predetermined measurement interval and including means for scanning the laser beam to displace the selected spot within the camera oculi during said measurement interval;

photoelectric converting means for receiving the light scattered from the camera oculia and operative to convert the scattered light into corresponding electric pulses when the intensity of the received scattered light is greater than a predetermined value;

counting means for counting the number of electric pulses produced by the photoelectric converting means to thereby measure the intensity of the scattered light; and

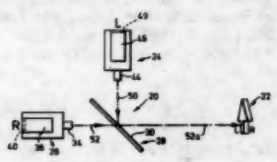
means for calculating the protein concentration due to the inflammation in the camera oculi of the eye according to the measured intensity of the scattered light.

4,957,361

METHOD OF PRODUCING AND DISPLAYING A 3-D MOTION PICTURE

William C. Shaw, Streetsville, Canada, assignor to Imax Systems Corporation, Toronto, Canada

Continuation of Ser. No. 32,273, Mar. 31, 1987, abandoned. This application Jun. 22, 1988, Ser. No. 209,732
Int. Cl.[5] G03B *35/00*
U.S. Cl. 352—59 **4 Claims**



1. A method of producing and displaying a 3-D motion picture, which method comprises the steps of:

(a) providing a camera rig that includes first and second motion picture cameras each having a lens defining an optical axis, and a semi-transparent mirror;

(b) positioning the cameras and mirror in a relationship with respect to one another such that, with the rig in a datum position, the first camera is arranged with its said optical axis horizontal for recording images of a subject through the mirror along a first axis coincident with its said optical axis, the said second camera is arranged with its optical axis at a 90° angle to the optical axis of the first camera, and the mirror is disposed at the intersection of said optical axes in a plane that bisects said 90° angle and permits the second camera to record images of the same subject along as second axis that is reflected by the mirror to be coincident with said optical axis of the second camera, said first and second axes being generally parallel to and spaced from one another by a defined distance and in a common horizontal plane, whereby one of the cameras receives "left eye" images of the subject and the other camera receives "right eye" images;

(c) making two master film negatives by exposing respective films in said cameras to subjects intended to appear in the motion picture and developing the films;

(d) making respective prints from said master film negatives;

(e) projecting respective left and right eye images from the two prints to provide 3-D images on a screen; and,

(f) optically coding the left and right eye images and providing a viewer with optical decoding means for ensuring that left eye images are presented to the viewer's left eye only and that right eye images are presented to the viewer's right eye only;

the improvement comprising the combination of:

(i) in step (b), positioning said second camera with its said optical axis vertical, and providing that said first and second cameras are of a type in which film travels generally horizontally through the camera in said datum position of the rig such that an erect subject is recorded on said film in said first camera as a series of parallel inverted images and, on said film in said second camera, as a series of images that are similar to the images on the film in the first camera, but turned laterally of the film as a result of being reflected in said mirror, said images extending transversely of the film in each camera;

(ii) in step (d) making said prints from both of said master film negatives by contact printing; and,

(iii) prior to projecting said images in step (e), positioning the contact print made from the master film negative from the

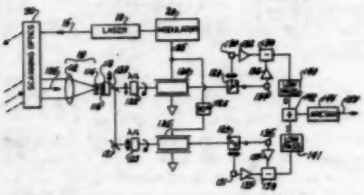
first camera in a normal orientation for projection, and turning the contact print made from the master film negative from the second camera face for face about a longitudinal axis of the print, so that images on said print are turned laterally of the print as compared with the images as recorded during photography, whereby the images on the two prints are brought into corresponding orientations for projection.

4,957,362

METHOD AND APPARATUS FOR ELECTRO-OPTICAL PHASE DETECTION

Lauren M. Petersoo, Ann Arbor, Mich., assignor to Environmental Research Institute of Michigan, Ann Arbor, Mich.

Filed Sep. 8, 1989, Ser. No. 404,847
Int. Cl.[5] G01C *3/08*; H04B *9/00*; G02B *6/10*
U.S. Cl. 356—5 19 Claims



1. A method for detecting the phase difference between a reference RF signal and the modulation of a received optical beam comprising:

modulating said received optical beam by the reference RF signal thereby producing an RF modulated first optical beam;

detecting the first difference cross modulation in said RF modulated first optical beam between the modulation of the received optical beam and said modulation by the reference RF signal;

generating a phase shift reference RF signal having a ninety degree phase shift from the reference RF signal;

modulating said received optical beam by the phase shift reference RF signal thereby producing an RF modulated second optical beam;

detecting the second difference cross modulation in said RF modulated second optical beam between the modulation of the received optical beam and said modulation by the phase shift reference RF signal;

dividing the second difference cross modulation of said RF modulated second optical beam by the first difference cross modulation of said RF modulated first optical beam, said quotient being proportional to tangent of the phase difference to be detected.

4,957,363

APPARATUS FOR MEASURING CHARACTERISITCS OF PARTICLES IN FLUID BY DETECTING LIGHT SCATTERED AT THE PARTICLES

Kazuo Takeda, Kokubunji, and Yoshitoshi Ito, Ome, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 1, 1988, Ser. No. 214,515
Claims priority, application Japan, Jul. 3, 1987, 62-165176
Int. Cl.[5] G01N *15/14*, *21/53*
U.S. Cl. 356—73 5 Claims

1. A particle measurement apparatus comprising:

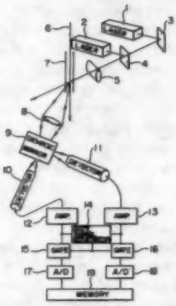
means for generating laser lights having wavelengths which are different from each other;

a flow cell through which a fluid sample including particles flows;

focusing means for collecting said laser lights and for irradiating said fluid sample therewith;

monochrometer means for wavelength-separating scattered light from said particles;

a plurality of detector means for detecting the wavelength-separated scattered light from said monochrometer means; and



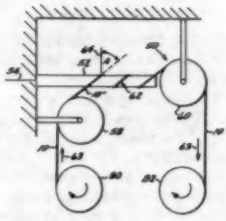
measuring means for extracting output pulse signals of said plurality of detector means which are indicative of said particles and which are coincident with each other in timing of detection so as to enable measurement of the number, size and refractive index of said particles by use of said extracted output pulse signals of said plurality of detector means.

4,957,364

HELICAL BEND PROOF TESTING OF OPTICAL FIBERS

Ronald B. Chesler, Woodland Hills, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Apr. 18, 1989, Ser. No. 339,845
Int. Cl.[5] G01N *21/88*
U.S. Cl. 356—73.1 18 Claims



1. Apparatus for proof testing optical fibers, comprising:

a cylindrical mandrel;

a first guide disposed for directing an optical fiber tangential to the mandrel, the first guide being positioned at a first location along the cylindrical axis of the mandrel; and

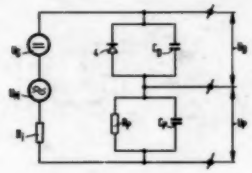
a second guide disposed for directing the optical fiber away from the mandrel, the second guide being positioned at a second location along the cylindrical axis of the mandrel.

4,957,365

OPTICAL, METER WITH DUAL FUNCTIONS AVALANCHE PHOTODIODE

Ernst Brinkmeyer, Buchholz, Fed. Rep. of Germany, assignor to U.S. Philips Corp., New York, N.Y.

Filed Dec. 12, 1988, Ser. No. 283,413
Claims priority, application Fed. Rep. of Germany, Dec. 23, 1987, 3743678
Int. Cl.[5] G01N *21/88*; G01C *3/08*
U.S. Cl. 356—73.1 20 Claims



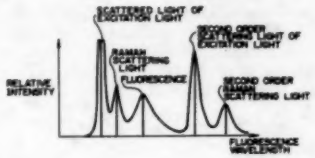
1. An optical backscattering meter arrangement comprising:
an optical transmitter/whose transmission power is modulated (swept) with a variable frequency via an oscillator and whose transmission beam is applied to a light wave cable (LWL) via a beam splitter, an avalanche photodiode optical receiver, to which optical receiver are applied, via the beam splitter, portions of the transmission beam that are scattered back from the light wave cable (LWL), wherein a mixing signal is formed in the optical receiver from a signal proportional to the optical backscattering power and a modulation voltage having the oscillator frequency, means for evaluating said mixing signal for determining the location of the backscattering and the intensity of the backscattering, means for applying to the avalanche photodiode a bias voltage including a d.c. voltage (U_G) modulated by the modulation voltage (U_M), and wherein the mixing signal (U_p) is tapped at a parallel circuit comprising an ohmic resistor (R_p) and a capacitor (C_p) inserted in an energizing circuit of the photodiode.

4,957,366

FLUORESCENCE SPECTROPHOTOMETER AND WAVELENGTH SETTING METHOD THEREFOR

Hiroyuki Koshi; Minoru Owada, both of Katsuta; Hisako Minegishi, Mito, and Takayuki Ono, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 22, 1989, Ser. No. 313,440
Claims priority, application Japan, Feb. 24, 1988, 63-39417
Int. Cl.[5] G01N *21/64*
U.S. Cl. 356—318 11 Claims



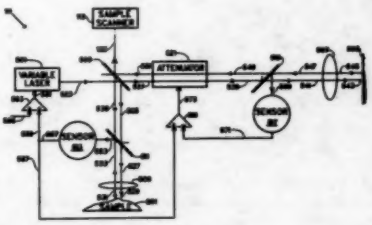
1. A fluorescence spectrophotometer comprising:
a light source;
an excitation side spectroscope for separating light emitted by said light source in wavelength and projecting excitation light having a specified wavelength on a sample;
a fluorescence side spectroscope for separating fluorescence emitted by said sample in wavelength;
a detector for detecting light emitted by said fluorescence side spectroscope;
means for storing a first spectrum, when either one of said spectroscopes is fixed to an arbitrary wavelength and the wavelength of the other is scanned;
means for storing a second spectrum, when said one of the spectroscopes is fixed to another wavelength, which is different from said arbitrary wavelength, and the wavelength of the other is scanned; and
means for comparing said first spectrum with said second spectrum and setting said excitation or fluorescence side wavelength for the wavelength when corresponding peaks in the two spectra are approximately in accordance with each other.

4,957,367

INTEFEROMETRIC IMAGING SYSTEM

Lev Dulman, 2366 33rd Ave., San Francisco, Calif. 94116

Filed May 31, 1988, Ser. No. 200,574
Int. Cl.[5] G01B *9/02*
U.S. Cl. 356—359 12 Claims



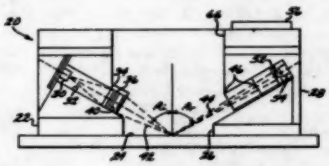
7. A method of comprising the steps of:
obtaining an interferometric image to produce a sample scan;
converting said sample scan to a sample signal;
generating a comparison signal corresponding to a scan of an interferometric image for said sample object;
monitoring the position on said sample object corresponding to the current value of said comparison signal; and
storing the position of said sample object corresponding to the current value of said sample signal and said exemplar signal so as to identify the location of possible discrepancies between said sample object and said exemplar.

4,957,368

APPARATUS AND PROCESS FOR PERFORMING ELLIPSOMETRIC MEASUREMENTS OF SURFACES

Tennyson Smith, Orem, Utah, assignor to Photoacoustic Technology, Inc., Westlake Village, Calif.

Filed Mar. 16, 1989, Ser. No. 324,449
Int. Cl.[5] G01J *4/00*
U.S. Cl. 356—369 16 Claims



12. Surface measurement apparatus for determining the properties of a surface, comprising:
means for measuring the properties of the surface by an ellipsometric measurement, the means including at least one pair of ellipsometric sensors, the sensors of each pair

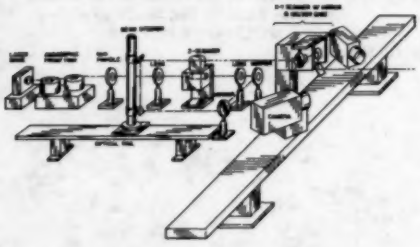
having no moving parts and operating at the same light wavelength and angle of incidence, the sensors of each pair differing in that one sensor has a quarter wave plate in the optical path and the other sensor has no quarter wave plate in the optical path.

4,957,369

APPARATUS FOR MEASURING THREE-DIMENSIONAL SURFACE GEOMETRIES

Erik K. Antonsson, Pasadena, Calif., assignor to California Institute of Technology, Pasadena, Calif.

Filed Jan. 23, 1989, Ser. No. 298,931
Int. Cl.[5] G01B *11/24*
U.S. Cl. 356—376 **19 Claims**



1. A three-dimensional measurement apparatus for accurately determining the precise geometric shape of an object; the apparatus comprising:

a source of radiation;

means for focusing a spot of said radiation onto said object;

means for scanning said focussed spot of radiation over the surface of said object;

a pair of detectors positioned relative to said object for receiving radiation reflected from said focussed spot on said object, each said detector providing electrical signals representing the instantaneous two-dimensional coordinates of said spot of radiation as received by each said detector;

means for calculating the three-dimensional coordinates of said spot of radiation on said object from said electrical signals provided by said detectors; and

said focussing means comprising a Z-axis optical scanner having a focal length that is continuously variable over a pre-selected range and driving means for varying said focal length within said range.

4,957,370

METHOD AND APPARATUS FOR DETERMINING THE DEGREE OF OXIDATION OF AN OXIDE COATING

Mamoru Tominaga, Kawagoe; Leo Mori, and Junetsu Akiyama, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Continuation of Ser. No. 282,863, Dec. 9, 1988, abandoned, which is a continuation of Ser. No. 112,060, Oct. 26, 1987, abandoned, which is a continuation of Ser. No. 748,305, Jun. 20, 1985, abandoned. This application Sep. 6, 1989, Ser. No. 404,050
Claims priority, application Japan, Jun. 21, 1984, 59-127843
Int. Cl.[5] G01B *11/02*
U.S. Cl. 356—381 **24 Claims**

1. An apparatus for determining the thickness of a layer of copper oxide on an object comprising:

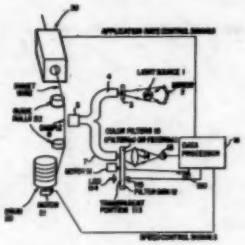
illumination means producing a light having a known spectral distribution;

illuminating light guide means for directing said light from said illumination means onto said object;

reflecting light guide means for directing reflections of said light from said object to a first area;

filter means mounted in said first area for filtering said reflected light received from said reflecting light guide means into two wavelength zones;

determining means for receiving said reflected light filtered by said filter means and for measuring the quantities of said reflected light in said two wavelength zones; and



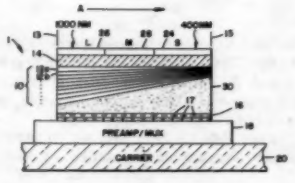
calculating means for calculating a value representing a relationship of said reflected light quantities, and for thereby determining the thickness of said copper oxide layer on said object from a predetermined correspondence between copper oxide thicknesses and values for said relationship.

4,957,371

WEDGE-FILTER SPECTROMETER

Samuel F. Pellicori, and Aram M. Mika, both of Santa Barbara, Calif., assignors to Santa Barbara Research Center, Goleta, Calif.

Filed Dec. 11, 1987, Ser. No. 132,227
Int. Cl.[5] G01J *3/12, 3/50*
U.S. Cl. 356—419 **21 Claims**



1. A wedge-filter spectrometer comprising:

means for spectrally dispersing an incident radiation beam, said dispersing means comprising a first plurality of layers of high (H) index of refraction material and a second plurality of layers of low (L) index of refraction material, individual ones of said H and said L layers overlying one another in a given sequence

H LL HLHLHL HH LHLHLH LL HL

each of said H and said L layers having a substantially linearly tapered thickness of substantially constant slope, said layers HH being a spacer layer having a predetermined thickness for defining a passband, the thickness being substantially equal to a length associated with a number of whole wavelengths that evenly fit within the thickness of said spacer layer; and means, optically coupled to said dispersing means, for detecting at a plurality of points within a two-dimensional area a spectrally dispersed radiation beam, the radiation beam being spectrally dispersed by said H and said L layers.

4,957,372

MEANS FOR IMPROVING THE UNIFORMITY-PERFORMANCE OF COLD FEED RUBBER-EXTRUDERS

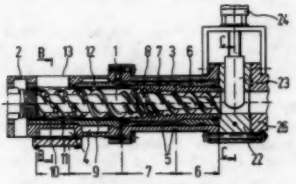
Paul Meyer, Locarno-Muralto, Switzerland, assignor to Frenkel C-D Aktiengesellschaft, Vaduz, Liechtenstein

Continuation of Ser. No. 331,808, Apr. 3, 1989, abandoned. This application Aug. 29, 1989, Ser. No. 401,472

Claims priority, application United Kingdom, Apr. 7, 1988, 8808107

Int. Cl.[5] B28C *1/16*

U.S. Cl. 366—76 20 Claims



1. A cold feed extruder comprising a screw rotatably mounted in a barrel, with a feed-inlet including a feed pocket, a compression-section, a plasticizing section and an exit-section being formed by these components and a feed-roller forming a part of the feed-inlet, with the combination of:

providing the said screw at least over the length of the said feed-inlet with notches cut across the screw-flights at a lead-angle greater than that of these flights, for a positive pulling in and forward transport of fresh feed; providing throttling means usable for achieving a required degree of plastification and for adjusting the amount of squash-back of partly plasticised feed from the screw into the feed inlet; and providing an independently variable speed drive for the said roller in said feed-inlet, the said roller being cored for a tempering fluid, for exerting control over the supply of fresh feed; where by this combination of features the screw is kept running full at the inlet to the compression-zone and the composition of its contents as of fresh feed and of squash-back from the rolling bank is kept constant.

4,957,373

METHOD AND APPARATUS FOR MIXING BULK MATERIALS IN POWDERED OR GRANULAR FORM

Michael Derksen, Lüdenscheid, and Joachim Domke, Menden, both of Fed. Rep. of Germany, assignors to Herfeld GmbH & Co. KG, Fed. Rep. of Germany

Filed Sep. 18, 1989, Ser. No. 408,551

Claims priority, application Fed. Rep. of Germany, Oct. 24, 1988, 3836216

Int. Cl.[5] B01F *9/06*

U.S. Cl. 366—197 19 Claims

1. A method of mixing powdered or granular material contained within a mixing vessel comprising:

(a) rotating said vessel in one direction through substantially 180° about a substantially horizontal axis from an initial position in which said vessel has a substantially vertical axis to a mixing position;

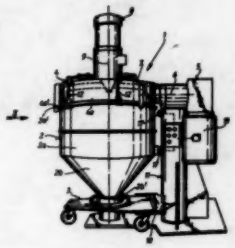
(b) mixing said material in said mixing position;

(c) rotating said vessel in the opposite direction from said mixing position past said initial position by a predetermined angle to an intermediate position;

(d) maintaining said vessel in said intermediate position a predetermined period of time; and

(e) rotating said vessel in said one direction from said intermediate position to return said vessel to said initial position,

(f) the speed of rotation from said initial position to said mixing position being greater than the speed of rotation of



said vessel from said mixing position to said intermediate position.

4,957,374

TUNNEL FURNACE HEIGHT DETECTOR

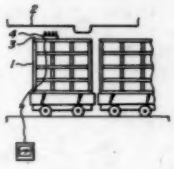
Keiji Yasuda, Niwa; Tetsuo Kamijyo, and Kazuhiro Miyahara, all of Nagoya, Japan, assignors to NGK Insulators, Ltd., Japan

Filed Mar. 24, 1989, Ser. No. 328,516

Claims priority, application Japan, Mar. 25, 1988, 63-38482

Int. Cl.[5] G01B *5/00*; G01K *1/14*

U.S. Cl. 374—142 7 Claims



1. A tunnel furnace height detector for detecting a variable ceiling height of a tunnel furnace, comprising a plurality of detecting units arranged on a trolley traveling in said tunnel furnace, said plurality of detecting units each having a height which is progressively increases by a predetermined distance, each of said detecting units comprising:

a support base; and

a solid piece pivotally connected to said support base, said solid piece having one end to contact said ceiling and another end to open or close an electrical measuring circuit;

wherein said solid piece is pivoted when said one end contacts said ceiling such that said another end opens said electrical measuring circuit, and said solid piece automatically returns to a position where said another end closes said electrical measuring circuit when said one end is spaced from said ceiling.

4,957,375

APPARATUS FOR GUIDING A SHAFT

Dieter Hoffmann, Buchs, Fed. Rep. of Germany, assignor to Kern & Co. AG, Aarau, Switzerland

Filed Oct. 10, 1989, Ser. No. 418,531

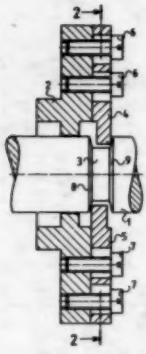
Claims priority, application Switzerland, Nov. 15, 1988, 4221/88

Int. Cl.[5] F16C *23/02*

U.S. Cl. 384—247 10 Claims

1. An apparatus for guiding a shaft in a bearing comprising

a shaft having guiding surfaces around its circumference for axial guidance, and a bearing having sliders that may be fastened to the bearing and which are effective as stops for the



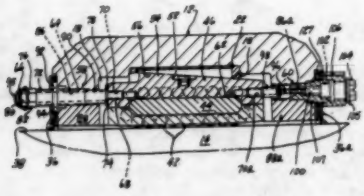
guiding surfaces, wherein the guiding surfaces are oblique in radial direction with respect to a reference plane at right angles to the axis of said shaft, and wherein said sliders are slideable in a radial direction along the bearing.

4,957,376

LINEAR BEARING WITH A HEIGHT ADJUSTMENT MECHANISM

Robert E. Ward, Jr., Charlotte, N.C., assignor to The Warner & Swasey Company, Cleveland, Ohio

Filed May 22, 1989, Ser. No. 354,958
Int. Cl.[5] F16C *29/06, 23/06*
U.S. Cl. 384—43 **6 Claims**



1. In combination with a linear bearing (20) having an improved height adjustment mechanism (58) said bearing (20) installed in a recess (18) defined in a structure (12), adapted to support movement of said structure (12) in a lengthwise direction on a way surface (38), mating sloping surfaces (54, 56) fixed relative to the bearing (20) and structure (12) respectively, causing a height position change of the bearing (20) in the recess (18) upon lengthwise shifting of the bearing (20) relative to the strucutre (12), an adjustment mechanism (58) drivingly interconnecting a wall (88) defining in part said recess (18) in said structure (12), and said bearing (20) allowing selective adjustment of the lengthwise position of said bearing (20) relative to said structure (12), said adjustment mechanism (58) characterized by an elongated stud (64) fixed at one end to said bearing (20) and extending through a bore (88) in said wall (88);

an elongated tubular adjustment bushing (72) received over said stud (64) and threaded to said bore (86) in said wall (88) and having either end protruding from either side of said wall (88), one end engaging said bearing (20);

said stud (64) having an end extending through said wall (88) and protruding beyond the other end of said bushing (72) away from said bearing (20), said protruding end of said stud (64) threaded;

a reaction element (80) threaded to said protruding end of said stud and advanced thereon to be engaged with the other end of said adjustment bushing (72) so as to prevent endwise relative movement thereof in the direction of said reaction element (80), but allowing rotation of said adjustment bushing (72);

the opposite end of said adjustment bushing (72) abutting against said bearing (20), and,

a locking element (92) selectively engageable to prevent rotation of said bushing (72) in said bore (86) in said wall (88).

6. A method of carrying out a height adjustment of a linear bearing (20) mounted in a recess (18) formed in a mounting structure (12), aid structure (12) and said bearing (20) having complementarily shaped sloping surfaces (54, 56) such that upon lengthwise adjustment of the position of said bearing (20) in said recess (18), a bearing height adjustment is achieved, said method characterized by attaching an elongated stud (64) at one end to said bearing (20) extending said stud (64) through a wall (88) forming in part said recess (18), fitting an elongated tubular bushing (72) over said stud (64), and also extending said bushing (72) through a bore (86) in said wall (88) with a threaded engagement between said bore and said bushing; preventing an endwise shifting of said bushing (58) on said stud (64) by means of a reaction element threaded on the stud while allowing rotation thereon; abuttingly engaging said bushing against said bearing (20); rotating said bushing (72) in said threaded bore (86) to shift said bearing (20) in either direction to achieve a desired height adjustment of said bearing (20);

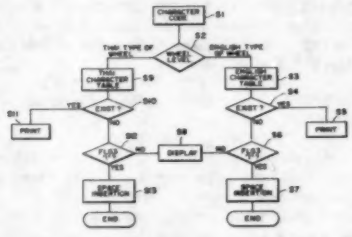
thereafter locking said bushing (72) against rotation in said bore (86) to secure said adjusted bearing position.

4,957,377

ELECTRONIC APPARATUS HAVING A PRINTING FUNCTION

Tsutomu Takahashi, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 86,189, Aug. 14, 1987, abandoned, which is a continuation of Ser. No. 790,208, Oct. 22, 1985, abandoned. This application May 2, 1989, Ser. No. 346,303
Claims priority, application Japan, Oct. 31, 1984, 227980; Oct. 31, 1984, 227981; Oct. 31, 1984, 227982
Int. Cl.[5] B41B *27/46*
U.S. Cl. 400—50 **8 Claims**



1. A printer comprising:

designation means for designating characters to be printed;

printing means for printing characters in the same order that said characters were designated by said designation means;

judgement means for judging whether a character designated by said designation means can be printed by said printing means;

display means for displaying a message;

selection means for selecting in lieu of character printing either formation of a space or generation of a message on

said display means indicating that the printing of the character is impossible, said selection means operative when said judgment means judges that the printing of the character is impossible; and

control means for forming said space or generating said message in response to a selection of the selection means when said judgment means judges that the printing of the character is impossible.

4,957,378

PRINTING-PLATE PREPARATION APPARATUS EMPLOYED IN SCREEN PRINTING MACHINE INCLUDING A NON-ADHESIVE PLATEN SURFACE AND A MANUSCRIPT READING UNIT.

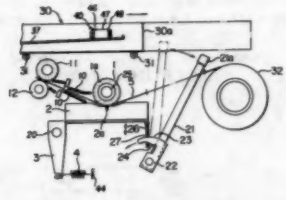
Masayuki Shima, Sendai, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 92,574, Sep. 1, 1987, abandoned. This application Oct. 21, 1988, Ser. No. 262,270

Claims priority, application Japan, Sep. 9, 1986, 61-138680

Int. Cl.[5] B41J *3/24*

U.S. Cl. 400—120 **7 Claims**



1. A printing-plate preparation apparatus comprising:

(a) a platen roller an outer layer of which is made of a non-adhesive elastic material;

(b) a thermal printhead positioned so that, said thermal printhead can be brought into operative association with said platen roller;

(c) a bracket swingably supported on a first axle, said thermal printhead being mounted on said bracket and said bracket being swingable back and forth between a first position in which said thermal printhead is operatively associated with said platen roller and a second position;

(d) means for biasing said thermal printhead towards operative association with said platen roller;

(e) a manuscript-reading unit movable back and forth between a first position and a second position; and

(f) a pressure-release lever swingably mounted on a second axle for movement back and forth between a first position and a second position, said pressure-release lever:

(i) being linked to said bracket so that, when said pressure-release lever moves from its first position to its second position, said bracket moves from its first position to its second position, and

(ii) having a portion that protrudes into the path of said manuscript-reading unit such that, as said manuscript-reading unit moves from its first position to its second position, said portion contacts said pressure-release lever, causing said pressure-release lever to move from its second position to its first position.

4,957,379

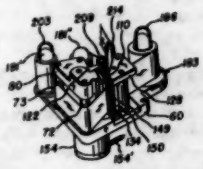
PRINTING APPARATUS

Paul H. Hamisch, Jr., Franklin, and David R. Wisecup, Xenia, both of Ohio, assignors to Monarch Marking Systems, Inc., Dayton, Ohio

Filed Jan. 11, 1989, Ser. No. 296,171

Int. Cl.[5] B41J *2/315, 2/32*

U.S. Cl. 400—120 **11 Claims**



1. Printing apparatus, comprising: a platen roll having an axis of rotation, a thermal print head having thermal printing elements disposed in a straight line and cooperable with the platen roll, and means for mounting the print head, the mounting means including a stationary post generally parallel to the platen roll axis, a mounting member connected to the print head, the mounting member being pivotally supported on the post, and means for adjusting the mounting member relative to the post to bring the line of printing elements into parallel relationship with respect to the platen roll axis.

4,957,380

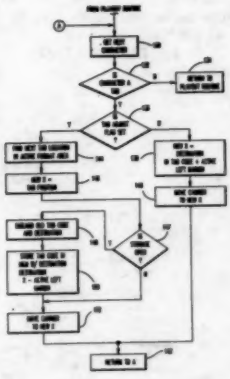
TAB ADJUST FUNCTION FOR AN ELECTRONIC TYPEWRITER TO PERMIT THE SHIFTING OF TABS FROM A FIRST TO A SECOND FORMAT

Patrick J. Gerstle, Nicholasville, Ky.; Mac A. Mathis, Austin, Tex.; David R. Smith, and Kathryn R. Stilz, both of Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 14, 1988, Ser. No. 167,810

Int. Cl.[5] B41J *21/17*

U.S. Cl. 400—279 **4 Claims**



1. An electronic typewriter with a tab adjust function, said typewriter comprising a keyboard for inputting characters and commands; a platen for supporting a record sheet; a print mechanism for forming marks on said record sheet responsive to said keyboard; an escapement means for moving said print mechanism parallel to said platen in at least a left to right direction; electronic control means for controlling said escapement means; memory means; means for storing in and retriev-

ing from said memory means text and command codes entered through said keyboard;

said electronic control means comprising means for storing an operator designated left margin location and means for storing operator designated tab stop locations and means for retrieving a selected one of said tab stop locations responsive to a tab code generated by a predesignated key on said keyboard being actuated;

means for determining a value representative of a distance from said left margin to said selected tab stop location;

means for storing said value with said stored text and command codes, in response to operator actuation of said predesignated key;

means for retrieving said stored command codes and value in conjunction with retrieving said stored text;

first means responsive to a retrieved command code and said value for determining a distance to be traversed by said print mechanism to place said print mechanism at said selected tab stop location;

said electronic control means further comprising a second means responsive to said retrieved command code for causing said means for retrieving a selected one of said tab stop locations to retrieve said selected one of said tab stop locations and means for determining a distance to be traversed in response to said retrieved tab stop location;

said electronic control means responsive to said stored command codes and said value for controlling said escapement means to move said print mechanism to said selected one of said tab stop locations; and

operator selectable means for enabling one of said first and said second means during retrieval of said stored text and command codes; thereby causing tab stop locations, relative to said left margin, stored in a first format to be used as stored or overridden by tab stop locations stored and used in a second format, depending upon the operator enablement of said first means or said second means.

4,957,381

PAPER FEEDING AND CUTTING CONTROL DEVICE IN A RECORDING APPARATUS

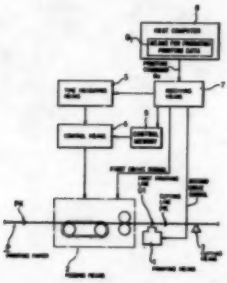
Kiyoharu Sakai, Suzuka, and Masaaki Hori, Nagoya, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

Filed Oct. 27, 1988, Ser. No. 263,076

Claims priority, application Japan, Oct. 30, 1987, 62-276797; Oct. 30, 1987, 62-276798

Int. Cl.[5] B41J *11/70*

U.S. Cl. 400—621 **10 Claims**



1. A paper feeding control device for controlling the feeding of a web of paper having in succession a plurality of equi-length segmental sheets each defining one page and having a transversal cutting line for cutting therealong to separate said segmented sheets from the rest of the web, said control device comprising:

mean for producing printing data on a page basis following a printing command signal;

means for carrying out printing in accordance with the printing data;

means for feeding the web of paper; means for cutting the web of paper;

means for receiving the printing command signal and producing a first drive signal to drive said printing means and a second drive signal to drive said feeding means;

means for measuring a period of time after completion of printing of a leading page and before a subsequent receipt of the printing command signal issued with respect to a page next to the leading page, and producing a time-expiration signal when the printing command signal is not issued before expiration of a predetermined period of time; and

means responsive to the time-expiration signal for controlling said feeding means to move the web of paper to a position where the cutting line of the leading page is in alignment with said cutting means.

4,957,382

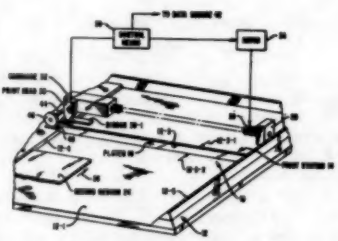
PLATEN-YOKE APPARATUS FOR A PRINTER USING A FLOATING PLATEN

Robert Delaney, Kettering, and Richard A. Merriman, Jr., Dayton, both of Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Dec. 6, 1989, Ser. No. 446,942

Int. Cl.[5] B41J *11/08*

U.S. Cl. 400—656 **12 Claims**



1. An apparatus comprising:

a print station;

a support means for guiding media to be printed upon to said print station; said support means having a media feeding surface, a bottom surface, and also having an elongated slot therein at said print station;

a platen being dimensioned to fit into said elongated slot and having first and second end portions;

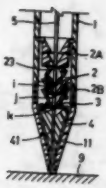
first and second resilient members positioned between said support means and said platen for resiliently moving said platen in a direction moving from said bottom surface toward said media feeding surface; and

a yoke member coupled to said bottom surface and said first and second end portions of said platen so as to maintain said platen substantially parallel to said media feeding surface when one of said first and second end portions is moved towards said bottom surface against the biss of said first and second resilient members.

4,957,383
LEAD PROPELLING DEVICE FOR AN AUTOMATIC PENCIL

Jia-Ming Sheu, Fl., 11-7, No. 3, Fu-Shin 2nd Rd., Ling-ya Dist., Kaohsiung, Taiwan

Filed Apr. 11, 1989, Ser. No. 336,076
Int. Cl.[5] B43K 21/22
U.S. Cl. 401—55 8 Claims



1. A lead propelling device for an automatic pencil which has a pencil tube with a lower tapered end and a lead supplying means in an upper portion of the pencil tube comprising:

an upper tubular body which has an upper end secured to an inner side of the lower tapered end of the pencil tube and which has a through-hole tapering downward for receiving a piece of lead and a first lead clamping face at a lower end of said through-hole, said tubular body being split along an axial plane thereof to cause said first clamping face to move between a clamping position and a releasing position,

a corrugated hollow member connected to said tubular member adjacent to said lower end of said through-hole, said corrugated hollow member having a corrugated wall with a plurality of indented annular portions defining second lead clamping faces, said corrugated hollow member being expandable and contractible, and said second lead clamping faces being movable between a clamping position and a releasing position thereof, said second clamping faces being in the clamping position when said first clamping face is in the releasing position thereof,

a cone-shaped lead guide member provided in said tapered end of said pencil tube and having a bottommost tube portion which protrudes outward from said tapered end, said lead guide member further having a cone-shaped cavity communicated with said corrugated hollow member and a lead receiving hole which is communicated with said cone-shaped cavity and which extends to said bottommost tube portion, said lead guide member being movable to place said bottommost portion in a protruding position and a retracted position, and

a spring means for urging said corrugated hollow member and said lead guide member to the clamping and the protruding positions respectively.

4,957,384
MECHANICAL PENCIL

Hidebei Kageyama; Yoshihide Mitsuya, and Youichi Nakazato, all of Kawagoe, Japan, assignors to Kotobuki & Co., Ltd., Kyoto, Japan

Filed Apr. 14, 1989, Ser. No. 338,201
Claims priority, application Japan, May 15, 1988, 63-63545[U]
Int. Cl.[5] B43K 24/08, 21/16
U.S. Cl. 401—65 3 Claims

1. A mechanical pencil comprising:

a tip member, having a longitudinal axis, coaxially arranged at a forward extremity end of an external cylinder having an axis;

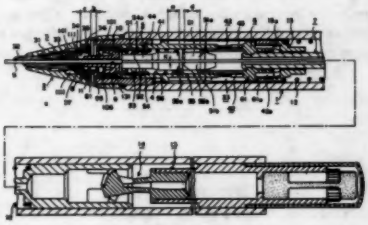
an axially slidable sleeve slidably engaged and held within said external cylinder;

a projection bar arranged at a forward extremity end of said sleeve;

a lead feeding mechanism, disposed within said sleeve, for allowing a lead to advance forwardly but preventing said lead from retracting rearwardly;

an axially slidable slider disposed within said tip member;

an axially slidable lead guide pipe, having a rear end portion slidable inserted into said projection bar, for covering and protecting said lead;



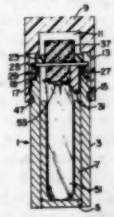
a resilient member, resiliently fitted between said slider and said projection bar, for yieldably urging said slider and said projection bar in axially opposite directions; and

a friction applying means, fixed within said slider, for applying a predetermined friction force to said lead and for fixing a front end portion of said lead guide pipe to said slider for axial movement of said lead guide pipe with said slider.

4,957,385
AMPULE SOLUTION DISPENSER APPLICATOR

Jack Weinstein, Manchester Township, Ocean County, N.J., assignor to Primary Delivery Systems, Inc., Annandale, N.J.

Filed Apr. 26, 1990, Ser. No. 514,736
Int. Cl.[5] A61M 35/00
U.S. Cl. 401—132 10 Claims



1. An ampule solution dispenser applicator, which comprises:

(a) a container base having a collar, and adapted to receive an ampule and adapted to hold at least half of said ampule firmly, and having an open area which would remain open surrounding an ampule upon insertion of an ampule, and further having means for removably attaching a cover thereto;

(b) a plunger adapted to be fitted over the collar of said base and adapted to have a first portion resting on said collar and adapted to be forcibly permanently attached to said collar at a second position, said plunger including means for holding an absorbent applicator such that a portion of said applicator would extend beyond said plunger and a portion of said applicator would extend below said plunger into said base, said plunger further including an extended wedge adapted to contact and break an ampule

upon said plunger being forced by pressure into its permanently attached said second position on the collar of said base;

(c) an absorbent applicator located within said plunger and extending beyond said plunger and extending below said plunger into said base; and,

(d) a cover adapted to be removably attached to said base, said cover having side walls and including a ledge located on said side walls which ledge is contactable with the top of said plunger such that when such cover is forcibly pushed onto the collar of said base, said plunger moves into the permanently attached second position on the collar of said base and said wedge of said plunger is movable therewith to break an ampule.

4,957,386

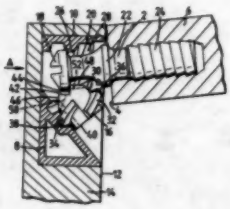
JOINING DEVICE

David N. Harley, Bournemouth, England, and James M. Holler, Jamestown, N.Y., assignors to Titus Tool Company Limited, Buckinghamshire, England

Filed Jan. 4, 1988, Ser. No. 140,763

Int. Cl.[5] F16B *9/02*

U.S. Cl. 403—231 **9 Claims**



1. A joining device for joining panels at right angles to each other, comprising an element having a head and a shank and adapted to be secured into one of said panels with said head and part of the shank projecting from an edge thereof, a holding member adapted to be fitted in a recess provided in a major surface of the other of said panels, aid holding member comprising a plug-like body portion having an end face arranged to be exposed at said major panel surface and having an opening extending therein axially from said end face to receive and surround said head, and means for achieving snap fitting of said head in said opening, said snap fitting means including an inward projection within said opening, and a securing member pre-assembled and thereby located within said body portion and adjacent to said opening, the securing member including means forming a shoulder-forming portion which, in a predetermined rotational position of the securing member within said body portion as a result of said pre-assembly, forms a shoulder on the other side of the opening relative to the projection, a distance between the shoulder-forming portion of the securing member and the projection on the body portion being less than the diameter of said head, for thereby enabling said head to be inserted into said opening and forced between the shoulder and the projection into a snap fitting location behind the shoulder and the projection, said securing member including tightening means in said securing member and adjacent the shoulder-forming means for engaging said head, during rotation of said securing means from said predetermined rotation position, to apply a force thereto to move said head inwardly relative to said opening to tighten the joint formed by said panels.

4,957,387

SPLINE JOINT

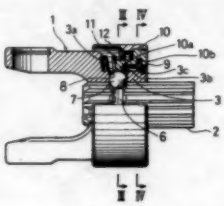
Kenji Nasu, Sanda, Japan, assignor to K.S. Sanoyas Co. Ltd., Sanda, Japan

Filed Jul. 29, 1988, Ser. No. 225,759

Claims priority, application Japan, Feb. 4, 1988, 63-14507[U]

Int. Cl.[5] B25G *3/18*; F16B *21/00*

U.S. Cl. 403—322 **13 Claims**



1. A spline joint comprising:

a shaft having an end portion having external splines, said end portion further forming a first annular groove;

a plurality of locking balls in rolling engagement with said first annular groove;

a hub having an internal portion including splines which are adapted to engage the external splines of said shaft, said hub further having a plurality of holes extending radially therethrough, the number of said holes being equal to the number of locking balls, each of said holes adapted to partially retain a locking ball which is positioned therein from a radially outward location;

a sliding sheath having an internal face encircling said hub, said sheath having an annular projection and a second annular groove in axially spaced relation around its locking balls in the direction of said first annular groove when said annular projection is positioned over said locking balls; and

a polygonal spring, the number of sides thereof being equal to the number of locking balls;

means for biasing said sliding sheath so that the annular projection engages the locking balls during normal joint operation where said biasing means comprises a coil spring;

wherein said second groove and said sliding sheath are adapted to embrace said polygonal spring so that the center of each side of said spring engages a locking ball when the second annular groove in said sliding sheath is slid into alignment with said holes through said hub.

4,957,388

BICYCLE FRAME TUBE NEW COUPLING STRUCTURE

Chin-Lang Liu, No. 20, 7th Rd., Industrial Park, Taichung, Taiwan

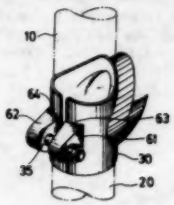
Filed May 11, 1989, Ser. No. 350,282

Int. Cl.[5] B60B *27/06*

U.S. Cl. 403—344 **1 Claim**

1. A bicycle frame tight coupling comprising a first tubular member having a slit along its longitudinal axis, a second tubular member axially movable and rotatable within said first tubular member, and a pair of solid lugs cooperating with a locking bolt and locking nut for tightening said first tubular member about said second tubular member and prohibiting movement therebetween, said solid lugs having large and curved front edges matching a curvature on the first tubular member and fastened to said first tubular member respectively on opposite sides of said slit by a silver brazing process, each of said solid lugs having flat side surfaces including an outer flat surface spaced from said longitudinal slit and an inner flat surface arranged directly at an edge of said longitudinal slit, said solid lugs forming a V-shaped space therebetween by said

inner flat surfaces with a base of said V-shaped space located at said longitudinal slit, each of said solid lugs having hole for receiving said locking bolt arranged at a distance from said first



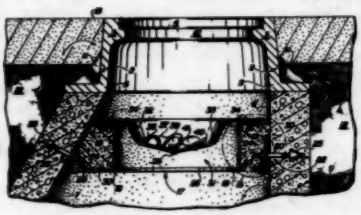
tubular member, said locking nut tightening on said locking bolt and holding said second tubular member within said first tubular member by torque created directly beneath and around said front edges of said solid lugs.

4,957,389

METHOD AND APPARATUS FOR SEALING MANHOLES

David L. Neathery, 1830 Willow Point, Shreveport, La. 71119

Filed Sep. 5, 1989, Ser. No. 402,477
Int. Cl.[5] E02D *29/14*
U.S. Cl. 404—72 **34 Claims**



1. An apparatus for sealing a manhole comprising a base having a base leg horizontally disposed in the manhole; a base leg opening provided in said base leg for accessing the manhole below said base leg; a mount leg upward-standing from the periphery of said base leg, said mount leg substantially conforming to the configuration of the wall of the manhole; mounting means engaging said mount leg and the wall of the manhole for securing said mount leg to the wall of the manhole; a masonry seal structure seated on said base leg and engaging said mount leg; and a seal structure opening provided in said masonry seal structure, said seal structure opening provided substantially coextensive with said base leg opening in said base leg of said base and insert means removably seated on said masonry seal structure, whereby water entering the manhole above said masonry seal structure and said insert means is trapped.

4,957,390

REINFORCEMENTS FOR ASPHALTIC PAVING, PROCESSES FOR MAKING SUCH REINFORCEMENTS, AND REINFORCED PAVINGS

Roy Shoesmith, Midland, Canada, assignor to Bay Mills Limited, Ontario, Canada

Filed Nov. 4, 1987, Ser. No. 116,351
Int. Cl.[5] E01C *5/08, 11/16*
U.S. Cl. 404—70 **29 Claims**

1. A prefabricated reinforcement for asphaltic paving comprising:

an open grid, preimpregnated with resin, comprising two sets of parallel strands of continuous filament fibers, each set of strands having openings between adjacent strands and the two sets being oriented substantially perpendicular to each other,

a coating of stable adhesive being preapplied to the grid primarily for the purpose of being activated for forming a tack coat free bond compatible with asphaltic paving,

the coating being preapplied to the underside of the impregnated strands of the lower surface of the grid without closing the openings between the strands, and

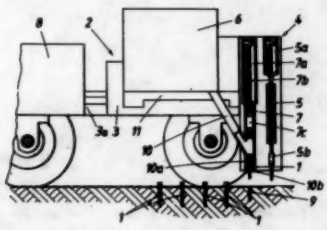
the grid having a strength of more than 25 kiloNewtons per meter in the direction of each set of parallel strands.

4,957,391

APPARATUS FOR SETTING MARKER PLUGS

Ulrich Kniesel, Franz-Lehar-Strasse 7, A-4540 Bad Hall, Austria

Filed Apr. 25, 1989, Ser. No. 343,071
Claims priority, application Austria, Apr. 25, 1988, 1040/88
Int. Cl.[5] E01F *9/04, 9/10*
U.S. Cl. 404—94 **3 Claims**



1. An apparatus for setting marker plugs for ground marking, each plug comprising a setting portion adapted to be set into the ground and a marking portion adapted to rise from the ground, the apparatus comprising

(a) a self-propelled vehicle;

(b) drive means for propelling said vehicle relative to the ground in a direction of travel;

(c) a carriage mounted and movable on said vehicle in said direction of travel,

(2) the carriage being operatively connected to said drive means for intermittently moving said carriage relative to said vehicle and the ground in said direction of travel in steps of predetermined length; and

(d) a setting unit carried by said carriage and comprising

(1) a plug magazine,

(2) a piercer and

(3) plug setter, the plug setter leading the piercer in said direction of travel at a spacing that is equal to the length of said steps.

4,957,392

METHOD AND APPARATUS FOR THE ACTIVE PREVENTION OF SEDIMENTATION IN HARBORS AND WATERWAYS

James A. Ballard, 1150 Ballard Ave., Carpinteria, Calif. 93013, and Scott A. Jenkins, 14765 Kalapana St., Poway, Calif. 92064

Filed Apr. 27, 1989, Ser. No. 344,079
Int. Cl.[5] E02F *3/88*; E02B *3/04, 5/28*
U.S. Cl. 405—73 **3 Claims**

1. An apparatus for preventing sedimentation build-up in harbor berthing area of the character having wharf fronting the berthing area, comprising a plurality of submergerd, scour units disposed adjacent said wharf in side-by-side relationship, each said scour unit comprising:

(a) a vertical tubular member having a vertical axis including an upper end and a lower end;

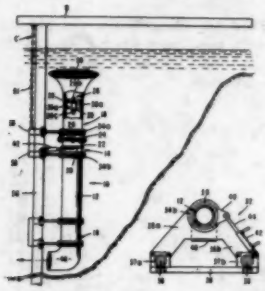
(b) inlet means connected proximate said upper end of said tubular member for directing the flow of water into said tubular member;

(c) turbine means mounted interiorly of said inlet means for controllably drawing water into said inlet means, said

turbine means including a rotating fan and hydraulic motor means for controllably rotating said fan;

(d) discharge means connected proximate the lower end of said tubular member for directing the flow of water outwardly therefrom in a generally horizontal direction to produce a near bottom, scour pattern of a predetermined configuration, said scour units being arranged along said wharf so that said scour patterns produced by said discharge means overlap one another;

(e) means for rotating each said discharge means about the vertical axis of each said tubular member, whereby each



said discharge means produces a scour pattern spanning about 180 degrees;

(f) operating means mounted on said wharf and operably interconnected with each said hydraulic motor means for providing hydraulic fluid for operating each said hydraulic motor means; and

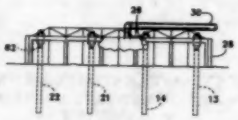
(g) means mounted on said wharf for raising and lowering each said tubular member.

4,957,393

IN SITU HEATING TO DETOXIFY ORGANIC-CONTAMINATED SOILS

James L. Buelt, Richland, and Kenton H. Oma, Richland, both of Wash., assignors to Battelle Memorial Institute, Richland, Wash.

Filed Apr. 14, 1988, Ser. No. 181,635
Int. Cl.[5] E02D *3/00*
U.S. Cl. 405—128 **12 Claims**



1. The method of detoxifying waste sites and the like containing hazardous volatilizable material, said method comprising:

inserting at least two electrodes through the soil surface into the ground proximate a said waste site and at spaced points from one another in substantially encompassing array to at least a portion of said waste site,

heating a region of ground adjacent the soil surface and therebelow to a temperature below the melting temperature thereof, said temperature being greater than 100° and less than 1200 °C., for an extended period of time in order to volatilize said material by applying a voltage between a pair of said electrodes adjacent the soil surface spanning said region for causing a current flow through said ground region therebetween of a value less than would melt the soil, and

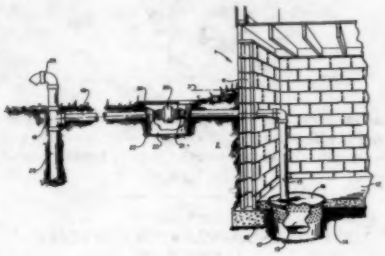
collecting said material, as volatilized, above ground level.

4,957,394

METHOD AND APPARATUS FOR SUB-FLOOR COLLECTION AND DISPOSAL OF RADON GAS

Jerry Jarnagin, and Dennis W. Dawson, both of Canton, Ill., assignors to Radon Home Products, Inc., Canton, Ill.

Filed Aug. 30, 1989, Ser. No. 400,377
Int. Cl.[5] B09B *3/00*
U.S. Cl. 405—128 **14 Claims**



1. An apparatus for collecting gas from the soil proximate a subterranean enclosure and harmlessly dispensing it in the atmosphere comprising

collecting means disposed substantially outside the subterranean enclosure comprising a collection chamber having perforations in the walls of the chamber so the inside of the chamber is in communication with zones outside the subterranean enclosure,

suction means comprising a fan having an intake end and an exhaust end and a resealable container within which the fan is disposed wherein said sealed container is mounted outside the subterranean enclosure and under ground level,

a ventilation duct having one end connected to the exhaust of said suction means and a second end having access to the atmosphere,

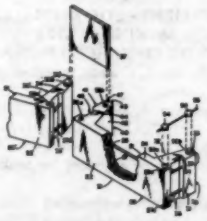
communication means connecting the inside of the collection chamber to the intake end of the fan thereby generating a suction in the collection chamber so that gas in the soil proximate the enclosure and collection chamber is drawn into the collection chamber, with the suction means pulling it therethrough and dispensing it harmlessly into the atmosphere remote from the enclosure.

4,957,395

PRE-CAST, REINFORCED CONCRETE RETAINING WALL SYSTEM

Ned Nelson, 3 Lake Bellevue Dr., #200, Bellevue, Wash. 98005

Filed Jun. 19, 1989, Ser. No. 368,028
Int. Cl.[5] E02D *5/20*
U.S. Cl. 405—287 **17 Claims**



1. A retaining wall module, comprising:

(a) a vertically disposed panel;

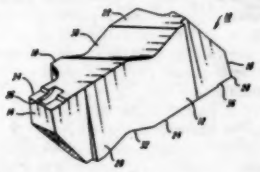
(b) a pair of vertically disposed flanges, said flanges horizontally disposed at opposite ends of said panel and projecting rearwardly therefrom, said flanges each having a vertically disposed outside recess, said recess being horizontally transversed by at least one exposed rod embedded in said flanges on each side of said recess.

4,957,396

CUTTING INSERT WITH CHIP CONTROL

Kenneth L. Niebauer, Raleigh, N.C., assignor to Kennametal Inc., Latrobe, Pa.

Filed Sep. 30, 1988, Ser. No. 252,425
Int. Cl.[5] B23P *15/28*
U.S. Cl. 407—114 20 Claims



1. An improved cutting insert with chip control features comprising an insert body having end wall regions having a predetermined width and defining in part a cutting edge and sides and top and bottom walls generally perpendicular to said sides, said insert body being invertible about an axis perpendicular to said sides thereof, said insert body having cutting edges at said end wall regions, whereby in each inverted position of said insert body a respective cutting edge is presented uppermost at the same end of said insert body, said top and bottom walls of said insert body defining therein engaging means for cooperating with a toolholder clamp means; a land region extending rearwardly from each said end wall region cutting edge toward said respective top or bottom wall and defining a surface region of a predetermined width; a back ramp extending generally upwardly from each said land region to said respective top or bottom wall; and a chipbreaker means defining a depression initiating in a forward portion of the land region proximate the cutting edge and extending into said back ramp, wherein said chipbreaker means depression bisects said back ramp such that two step-like features are defined in combination by said back ramp and land region and wherein said chipbreaker means depression having a pair of generally parallel side walls which are perpendicular to the cutting edge.

4,957,397

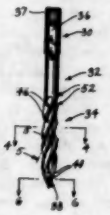
CUTTING TOOL

Mark J. Huff, P.O. Box 241, 119 E. James St., Wales, Wis. 53183

Filed Sep. 8, 1989, Ser. No. 404,836
Int. Cl.[5] B23B *51/00*
U.S. Cl. 408—224 12 Claims

1. A tool for use with a rotating device for forming an opening in an object, comprising:

an axial body portion having a relatively small number of first deep helical grooves formed therein with adjacent grooves defining an outer tip therebetween, said first grooves being oriented at a first angular relationship to the axis of said body portion, said body portion further having a relatively large number of second shallow grooves formed therein, said second grooves being formed in the outer tips disposed between adjacent first grooves and being oriented at a second angular relationship relative to the axis of said body portion opposite that of said first grooves, said second grooves defining pointed outer tips at the outer periphery of said tool; and



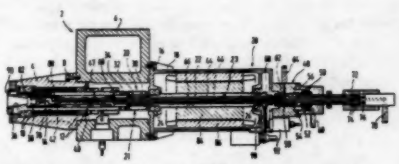
an end portion adapted for connection to said rotating device for imparting rotation to said body portion.

4,957,398

TWO-SECTION TOOL SPINDLE HAVING A CHANNEL FOR CARRYING PRESSURIZED FLUID

Manfred Schneider, Grossbottwar; Bernd Driesner, Penzberg, and Joerg Luetzkendorf, Ludwigsburg, all of Fed. Rep. of Germany, assignors to Friedrich Deckel Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Apr. 28, 1988, Ser. No. 187,159
Claims priority, application Fed. Rep. of Germany, Apr. 30, 1987, 3714562
Int. Cl.[5] B23C *5/10, 11/10*
U.S. Cl. 409—136 5 Claims



1. A two-section tool spindle apparatus, comprising:

a spindle housing;

a two-section main tool spindle and a drive motor therefor, said two-section main tool spindle including a hollow spindle section and a motor shaft section, said spindle section being rotatably supported in said spindle housing for rotation about a rotational axis, said hollow spindle section and said motor shaft section being distinct and separate parts of said main tool spindle, said motor shaft section including means for rendering said motor shaft section an integral part of said drive motor, said main tool spindle further including coupling means for coupling one axial end of said motor shaft section to one axial end of said hollow spindle section such that said motor shaft section and said hollow spindle section are coaxially aligned and rotationally fast, said hollow spindle section including means defining a tool receiving opening therein at an axial end thereof opposite said one axial end thereof;

a spreader bar axially movably disposed in said hollow spindle section and for rotation therewith, said spreader bar including means for releasably gripping a tool in said tool receiving opening and for facilitating a rotation thereof with said main tool spindle, said spreader bar having means defining an axially extending bore therethrough, said spreader bar being spaced radially inwardly from an inner peripheral surface of said hollow spindle section to define an axially extending first annular chamber radially between said spreader bar and said inner peripheral surface of said hollow spindle section, said first annular chamber having spring means provided therein for urging

said spreader bar axially away from said tool receiving opening;

means defining an axially extending bore through said motor shaft section, said motor shaft section including an axially extending hollow operating rod supported axially movably in said motor shaft section bore, said operating rod projecting axially beyond both axial ends of said motor shaft section, said operating rod having an axial end which is adjacent an axial end of said spreader bar, means for connecting said operating rod and said spreader bar at said adjacent axial ends thereof so that section in response to axial movement of said operating rod and said spreader bar will be axially movable in said hollow spindle section in response to axial movement of said operating rod and against said spring means toward said tool receiving opening, said motor shaft section further including an axially extending pipe disposed radially inside said hollow operating rod for conveying cooling medium therethrough;

said pipe having an axial end which is adjacent said axial end of said spreader bar, said main tool spindle including means for coupling said axial end of said pipe to said bore in said spreader bar such that said pipe is in fluid communication with said bore in said spreader bar, said pipe and said hollow operating rod being radially spaced from each other to define an axially extending second annular chamber radially therebetween;

said tool receiving opening end of said hollow spindle section including an axially facing end surface adjacent and surrounding said tool receiving opening, and means defining an auxiliary opening in said end surface adjacent said tool receiving opening;

said hollow spindle section including means for providing fluid communication between said spreader bar bore and said auxiliary opening, whereby said pipe is placed in fluid communication with said auxiliary opening; and

means for providing fluid communication between said first annular chamber and said tool receiving opening, and means for providing fluid communication between said first annular chamber and said second annular chamber, whereby said second annular chamber is placed in fluid communication with said tool receiving opening.

4,957,399

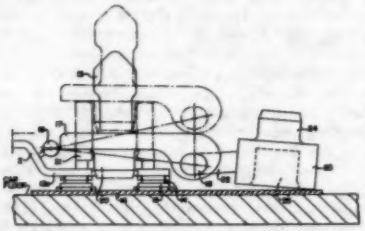
METHOD FOR CUSHIONING A CONTAINERIZED SHIPMENT BY RAILROAD FLATCAR

Anders Hove, Stockholm, Sweden, assignor to Buffers AB, Taby, Sweden

Division of Ser. No. 121,216, Nov. 16, 1987, abandoned. This application Sep. 13, 1989, Ser. No. 406,866

Int. Cl.[5] B61P *45/00*; B60D *1/64*

U.S. Cl. 410—87 **4 Claims**



1. A method for cushioning a containerized shipment by railroad flatcar against sudden accelerations and decelerations longitudinally of the flatcar due to jerking and bumping of the flatcar, comprising:

providing a railroad flatcar having a flat floor;

providing a container cushioning device which includes:

a longitudinally extending guide beam;

a plurality of longitudinally extending sliding plates;

a double-acting buffer heaving two opposite ends;

a longitudinally-extending movable beam mounted on said guide beam for limited longitudinal movement in two axially opposite directions and operatively associated with said double-action buffer for tending to damp longitudinal motion of said movable beam when said movable beam moves longitudinally in either of said axially opposite directions;

two axially spaced stops secured on said guide beam for limiting longitudinal movement of said movable beam in said two axially opposite directions;

two longitudinally spaced, transversally extending container beams secured to said movable beam for movement therewith in said two axially opposite directions;

each container beam having at least one sliding block;

said container beams, among them, having a sufficient number of appropriately-spaced, upwardly-projecting pins mounted thereon, for removably engaging alternatively in all four corner fittings of an ISO container;

removably screwing the guide beam onto the flat floor of the railroad flatcar so that the guide beam extends longitudinally of the flatcar;

disposing said sliding plates on said flat floor of said railroad flatcar spaced laterally to the left and to the right of said guide beam so that each sliding block of each container beam is disposed in sliding engagement with a respective sliding plate;

removably screwing each sliding plate onto the flat floor of the railroad flatcar;

lowering an ISO container onto said container cushioning device, so that each of four corner fittings of the container is mounted on a respective said upwardly-projecting pin; and

moving the railroad flatcar bearing said container along a rail line with said device on which said container is mounted cushioning said container against sudden accelerations and decelerations longitudinally of the flatcar due to jerking and bumping of the flatcar.

4,957,400

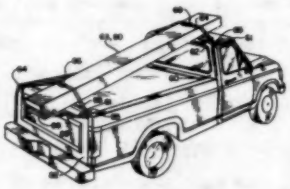
PICKUP TRUCK PADS FOR CARRYING LONG LOADS

John D. K. Karp, 15 Cornswamp Rd., York, Me. 03909

Filed Apr. 13, 1989, Ser. No. 337,291

Int. Cl.[5] B65D *63/00*; B62D *33/00*; B60R *9/04*

U.S. Cl. 410—110 **5 Claims**



1. Protective configured load carrying elastomeric foam plastic pads for a pickup truck comprising, as a set:

a cab pad comprising a configured elastomeric foam generally having a right angle shape in cross section an configured to fit the upper rear edge of the cab of a pickup truck and having a strap to secure it to said cab;

a tail gate pad comprising a configured elastomeric foam generally U shaped in cross section and configured to fit the upper edge of the tailgate of said pickup truck and having a strap to secure it to said tailgate;

clips held by said straps on either side of said pads, said clips serving to secure the pads to the vehicle and

said straps extending beyond said clips a substantial length,

permitting the straps to be secured over and hold a load resting on said pads.

4,957,401

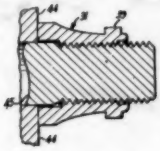
THREADED FASTENER HAVING MINIMIZED LENGTH AND WEIGHT AND METHOD TO MAKE IT

Edwin E. Hatter, Torrance, Calif., assignor to Hi-Shear Corporation, Torrance, Calif.

Continuation of Ser. No. 637,399, Aug. 3, 1984, abandoned, which is a division of Ser. No. 338,249, Jan. 11, 1982, Pat. No. 4,485,510. This application Nov. 9, 1987, Ser. No. 118,524

Int. Cl.[5] F16B *31/00, 37/16*

U.S. Cl. 411—5 **5 Claims**



1. A metallic fastener pin having a central axis, a head, a cylindrical shank, a shoulder contiguous to said shank reducing in diameter, a radius at the least diameter of said shoulder, a neck, and a helical thread, in the order recited from said head, the entire pin being made of a metal alloy whose surface strength and smoothness can be increased by cold working using localized mechanical compressive forces exerted thereon, said radius extending annularly around said pin and having had said mechanical compressive forces exerted on it, and the completed product not having been subjected to any heat treatment or annealing subsequent to said exertion of said mechanical compressive forces, said helical thread having a plurality of complete threads, all of which have a crest diameter and a root diameter, said root diameter being substantially equal to the contiguous unthreaded diameter of said neck, and an incomplete thread on the order of about one half the length of a full thread convolution, said incomplete thread being characterized by a root diameter equal to the root diameter of the complete threads, and a crest diameter which reduces continuously from the crest diameter of the complete threads to the said contiguous unthreaded diameter of said neck.

4,957,402

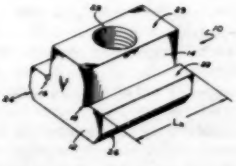
T-NUT WITH FURROWS

Georg D. Klein, R.F.D. 2, Lynch Rd., Monson, Mass. 01057, and Frank E. Carter, P.O. Box 39, Wales Rd., Brimfield, Mass. 01010

Filed May 5, 1989, Ser. No. 347,577

Int. Cl.[5] F16B *27/00, 39/00, 33/00*

U.S. Cl. 411—84 **5 Claims**



1. In a T-nut of the type that fits into a T-slot in a machine base to screw a work bed onto the base, the improvement comprising:

a. a rigid head with a top and bottom, wherein the bottom has a horizontal flat surface that maintains its shape when the work bed is screwed onto the base;

b. a shank that is integral with the head and which extends vertically from the horizontal flat surface, wherein the shank has a threaded vertical bore; and

c. a pair of parallel rigid furrows in the bottom of the rigid head, wherein the furrows run along opposite sides of the shank at a juncture between the shank and head, and wherein the furrows are adapted to maintain their size and shape and to straddle any burrs on a shoulder of the T-slot when the work bed is tightened in place, whereby the nut's rigid flat bottom surface sits flush against an underside of the slot and the nut's shank is squared to the base.

4,957,403

DEMOUNTABLE PIN FOR ROTATABLY CONNECTING TOGETHER TWO ELEMENTS OF SMALL AXIAL DIMENSION, PARTICULARLY SUITABLE FOR THE LEVER MECHANISMS OF TEXTILE MACHINES

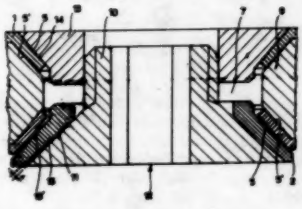
Luciano Corain, and Gianni Maltan, both of Vicenza, Italy, assignors to Nuovopignone - Industrie Meccaniche e Fonderia S.p.A., Florence, Italy

Filed Sep. 27, 1988, Ser. No. 249,658

Claims priority, application Italy, Oct. 2, 1987, 22118 A/87

Int. Cl.[5] F16B *33/00, 43/02*

U.S. Cl. 411—368 **5 Claims**



1. A demountable pin for insertion through and clamping together two frusto-conical flares sandwiching an element therebetween, eachh of said frusto-conical flares being formed in plate cheeks, said element being rotatably connected to said plate cheesks and having a pin passage and rotation bearing, said pin passage being aligned with said rotation bearing, said pin having a bolt with a frusto-conical under-head rigidly mounted thereto and an internal through bore, said pin being detachably affixed to an end nut after said pin is inserted through said two frusto-conical flares, said end nut also having a frusto-conical under-head, the frusto-conical under-heads of both the bolt and the nut having a taper substantially equal to a taper of said frusto-conical flares of said two cheeks, said frusto-conical under-head of said bolt being engaged with a washer having a fursto-conical surface when said pin is inserted through said two frusto-conical flares, the frusto-conical surface of said washer having a taper which is greater than the taper of said frusto-conical flares of said two cheeks.

4,957,404

FLAIL CHAIN UNLOADER FOR PARTICULATE MATERIAL

James W. Lepley, Smithville, Ohio, assignor to Flying Dutchman, Inc., Smithville, Ohio

Filed Jul. 24, 1989, Ser. No. 384,413

Int. Cl.[5] B65G *65/46*

U.S. Cl. 414—324 **18 Claims**

1. An unloader for discharging particulate material from a lower outlet of an upright storage vessel, comprising:

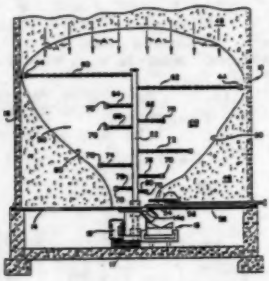
rotating shaft means mounted in said vessel adjacent a central portion thereof projecting upwardly of said lower outlet; and

flail means secured to said shaft means for rotation therewith to loosen said particulate materials contained in said vessel to flow downwardly for discharge through said lower outlet;

said flail means including a plurality of flail chains secured at their inner ends to said shaft means at spaced apart levels above said bottom outlet;

said plurality of flail chains comprises at least one upper flail chain of maximum length secured to said shaft means adjacent an upper level of said shaft means having an outer end movable in a generally circular path closely adjacent an inside wall surface of said vessel;

at least one set of lower flail chains secured to said shaft means at spaced apart ever increasing levels above said bottom outlet, said lower set of flail chains including a lowermost chain of minimum length and at least one other lower flail chain spaced above said lowermost chain having a greater length than said minimum length chain of said lower set of flail chains, said set of lower flail chains having lengths substantially less than said upper flail chain and increasing in length at each higher level in said set to generally match the angle of repose of said material in said vessel; and



at least one intermediate flail chain secured to said shaft means at a level spaced between said upper flail chain and said lower set of flail chains, said intermediate flail chain having a length substantially less than said upper flail chain and less than a lower flail chain of said set immediately therebelow for minimizing entanglement between said chains and movement of said upper flail chain from a downwardly hanging, at rest position, toward an outwardly extended position away from said shaft means and other flail chains upon initial rotation of said shaft means for discharging material from said vessel.

4,957,405

APPARATUS FOR MINING

Margaret A. Roberts, Morgantown, and Harry J. Brown, Barrackville, both of W. Va., assignors to Consolidation Coal Company, Pittsburgh, Pa.

Filed Sep. 26, 1988, Ser. No. 248,661
Int. Cl.[5] B65G *67/08*
U.S. Cl. 414—339 **2 Claims**

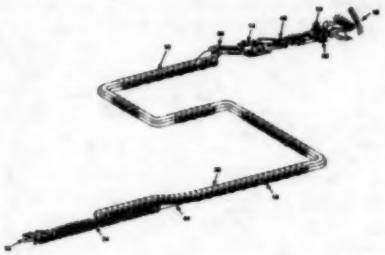
1. In a mining system having a self-propelled tramming conveyor for receiving mined material and depositing the material onto a cart type panel belt support structure comprising

a. the conveyor being self-propelled and having a plurality of pivotally interconnected units supporting continuous conveyor carrying driven flights, said units having outboard cylinders for lowering and raising said units so that said flights tram said conveyor to transport said conveyor in the unit lowered position and convey material in the unit raised position,

b. the cart type panel belt support having a plurality of pivotally interconnected mobile carts having a lower portion supporting a continuous material conveyor and an elevated upper portion for receipt of said tramming conveyor, so that the mined material can be deposited from said conveyor onto said panel belt.

c. said cart lower portion has upper and lower conveyor belt supporting rollers with said cart lower portion carrying guides for retaining mined material on said conveyor,

d. said carts each having an upper portion with outboard longitudinally extending opposed rails for receipt of said



outboard cylinders enabling said cylinders to raise and lower said tramming conveyor on said carts,

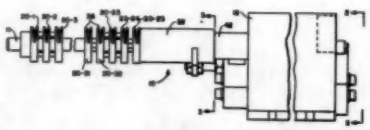
e. said carts also each having cross supports extending between said rails for supporting said conveyor flights in the lowered position enabling said conveyor flights to be driven along said cross supports on said carts, whereby said cylinders are positioned on said rails when said tramming conveyor is depositing material on said panel belt and said conveyor flights are inboard of said rails when said tramming conveyor is being driven on said carts.

4,957,406

APPARATUS FOR TRANSFERRING DISKS FROM ONE CASSETTE TO ANOTHER WITH DIFFERENT PITCH

Minoru Akagawa, Fremont, Calif., assignor to Intelmatec Corporation, Fremont, Calif.

Filed May 8, 1989, Ser. No. 349,399
Int. Cl.[5] B65G *65/04*
U.S. Cl. 414—416 **9 Claims**



1. An apparatus for transferring disks with center holes from one cassette to another having a different pitch, said apparatus comprising:

a rod elongated in a longitudinal direction,

an array of a plurality of serially concatenated disk-supporting pieces each which support one of said disks by an edge of the center hole thereof, one of said disk-supporting pieces at one end of said array being affixed to said rod and the rest of said disk-supporting pieces being supported by said rod slidably along said longitudinal direction,

connecting means each connecting together one of mutually adjacent pairs of said serially concatenated disk-supporting pieces such that the separation between each mutually adjacent pair of said disk-supporting pieces is variable but cannot exceed a predetermined maximum length, and

driving means adjacent the other end of said array for caus-

ing a closest one of said disk-supporting pieces to slidingly move along said rod,

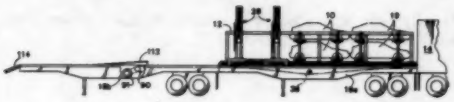
whereby said rod with said disk supporting pieces may pick up disks from one cassette, change the pitch of said disks, and then deposit the disks into another cassette.

4,957,407

METHOD AND APPARATUS FOR LOADING AND UNLOADING MOTOR VEHICLES FROM LIGHTWEIGHT SLEEVES WHICH ARE CARRIED IN STANDARD CARGO CONTAINERS

Peter Gearin, Portland, Oreg., assignor to G & G Intellectual Properties, Inc., Portland, Oreg.

Filed Jan. 13, 1989, Ser. No. 297,061
Int. Cl.[5] B65D *88/12, 88/52*
U.S. Cl. 414—498 **11 Claims**



10. A system for transporting vehicles, said system comprising:

(a) a sleeve proportioned for the receipt of a plurality of vehicles, said sleeve having an open end for the passage of vehicles thereinto;

(b) vehicle supporting means to suspend vehicles from the sleeve in mutually spaced relationship to one another;

(c) a sled separate and apart from said sleeve, said sled being adapted to support at least one vehicle and proportioned for movement through the open side of the sleeve;

(d) means to move the sled through the open end of and into the sleeve to position a vehicle on the sled for suspension by the vehicle supporting means; and

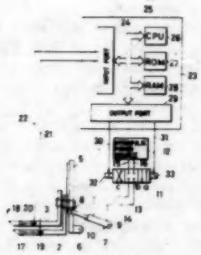
(e) means for removing the vehicles from said sled and supporting it from said vehicle supporting means so that the sled may be removed from the sleeve while leaving the vehicle within the sleeve.

4,957,408

DEVICE FOR CONTROLLING A FORK OF A FORKLIFT

Akira Ohkura, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Apr. 6, 1988, Ser. No. 178,233
Int. Cl.[5] B66F *9/06*
U.S. Cl. 414—635 **8 Claims**



1. A device for controlling a fork of a forklift, the fork having means for supporting and guiding prongs and two prongs supported by and guided along a pair of generally vertical masts by the means for supporting and guiding, each prong having a tip end, comprising:

a pair of tilt sensors, each sensor mounted on a separate tip end of said prongs;

an electronic control device having an input port and an output port, each said sensor operatively connected to said input port of said electronic control device, said electronic control device generating output signals at said output port on the basis of signals derived from said tilt sensors input to said input port;

a shaft;

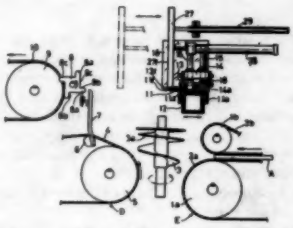
a pair of drive mechanisms, each drive mechanism rotating a separate one of the vertical masts about said shaft, said output signals connected to said drive mechanisms for causing independent movement of the directions and amounts of rotation of each of said generally vertical masts and the tilt of each prong so that each prong is maintained at a zero angle even if the center of gravity of a load on the prongs is not evenly shared by the prongs.

4,957,409

CORRUGATED CARDBOARD BOX STACKING DEVICE IN A CORRUGATED CARDBOARD BOX MAKING MACHINE

Masuzo Fukao, Isubata; Tadashi Sakai, Komatsu, and Kozo Murohashi, Kanazawa, all of Japan, assignors to Kabushiki Kaisha Ishikawa Seisakusho, Ltd., Kanazawa, Japan

Filed Aug. 30, 1989, Ser. No. 400,772
Int. Cl.[5] B31B *3/98;* **B65G** *57/30, 60/00;* **B65H** *31/30*
U.S. Cl. 414—788.4 **3 Claims**



1. A corrugated cardboard box stacking device in a corrugated cardboard box making machine, comprising:

a feed means for feeding manufactured and folded corrugated cardboard boxes one by one in the horizontal direction;

a front portion support means for supporting the front portion of the corrugated cardboard box fed from the feed means at a predetermined position in the longitudinal direction;

a pair of rotary screws arranged at right and left sides for stacking the corrugated cardboard boxes in a group from a lower to an upper portion in the area between the rotary screws, said rotary screws being arranged at intermediate position between the feed means and the front portion support means in the longitudinal direction for supporting a corrugated cardboard box fed from the feed means at its both sides to raise the corrugated cardboard box into a storing space by rotation;

a gauge plate which comes in contact with the upper surface of the rear end of the uppermost box in the group of the corrugated cardboard boxes for regulating the number of corrugated cardboard boxes to be stacked in the corrugated cardboard box storing space, which is positioned above the support means and the rotary screws;

a kicker which moves forward and backward along the under surface of the gauge plate and pushes out the uppermost corrugated card box to advance it a little ahead of the front edge of the gauge plate;

a count means for counting the number of the corrugated cardboard boxes moved from the storing space to a box

stacking space, which is positioned above and a little ahead of the storing space by the pushing action of the kicker and the lifting action of the rotary screws;

a pusher bar for transporting a group of the corrugated cardboard boxes in the box storing space by moving them forward when the number of the corrugated cardboard boxes stacked from below in the storing space reached a predetermined number; and

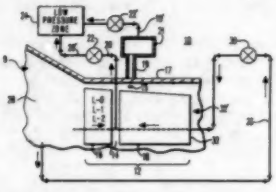
a discharge means for discharging the group of the stacked corrugated cardboard boxes conveyed by the pusher bar.

4,957,410

STEAM TURBINE FLOW DIRECTION CONTROL SYSTEM

George J. Silvestri, Jr., Winter Park, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 6, 1989, Ser. No. 306,188
Int. Cl.[5] F01D *25/30*
U.S. Cl. 415—169.1 **18 Claims**



1. In a reheat steam turbine having at least one turbine element with an impulse chamber and an exhaust stage, the steam turbine having other elements and zones wherein the pressure is lower than that of the exhaust stage, a system for reducing windage heating and resulting distress to turbine blading by prevention of Coanda-type flow, comprising:

outlet means located upstream of the exhaust stage for extraction of steam therethrough;

first duct means connecting said outlet means to a relatively low pressure zone;

first valve means connected to said duct means for controlling steam flow through said outlet means;

inlet means into the impulse chamber for introduction of exhaust steam from the exhaust stage;

second duct means connected between said inlet means and the exhaust stage; and

second valve means connected to said second duct means for controlling the flow to exhaust steam into the impluse chamber.

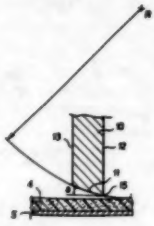
4,957,411

TURBOJET ENGINE WITH FAN ROTOR BLADES HAVING TIP CLEARANCE

Patrick L. E. Girault, Boissise-le-Roi, France, assignor to Societe Nationale d'Etude et de Construction de Moteurs d'Aviation S.N.E.C.M.A.

Filed May 11, 1988, Ser. No. 192,528
Claims priority, application France, May 13, 1987, 87 06671
Int. Cl.[5] F01D *5/20*
U.S. Cl. 415—173.4 **2 Claims**

1. A turbojet engine of the kind having a fan, said fan including an array of fan rotor blades, wherein each of said blades is mounted in said fan with a radial axis and has a radially outer tip, a convexly curved side, and a concavely curved side, said radially outer tip having a face with a radiussed profile having its radius of curvature centered at a point situated, on the one hand, forward of said radial axis of said blade, i.e., in a position offset on said concavely curved side of said blade relative to said radial axis, and, on the other hand, beyond the rotational axis of said engine relative to said blade so that said radiussed profile from said convexly curved side to said concavely curved side of said blade forms a sharp edge on a top end portion of said concavely curved side whereby said face of said



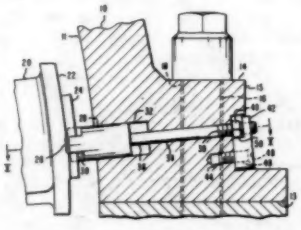
radially outer tip is adapted to enter an abradable lining of an inner wall of a casing of said fan.

4,957,412

APPARATUS AND METHOD FOR SUPPORTING THE TORQUE LOAD ON A GAS TURBINE VANE

Rick A. Olson, Apopka, and Perry E. Lowe, Altamonte Springs, both of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 6, 1988, Ser. No. 240,292
Int. Cl.[5] F01D *25/24*
U.S. Cl. 415—189 **14 Claims**



1. A gas turbine comprising:

a plurality of vanes, each of said vanes having a radially outboard end, an outer shroud being formed on said radially outboard end, each of said vanes subjected to a torque load, said torque load on each vane transmitted to its said outer shroud;

a cylinder, said cylinder retaining said vanes therein in a circular array concentric with said cylinder;

a first hole in said cylinder, said first hole extending radially from the inner surface of said cylinder through only a portion of the thickness of said cylinder, whereby said first hole has a bottom within said cylinder;

a pin, said pin having a first and second end, said pin disposed in said first hole;

means for engaging said first end of said pin with one of said outer shrouds, whereby said torque load on said outer shroud is transmitted to said cylinder; and

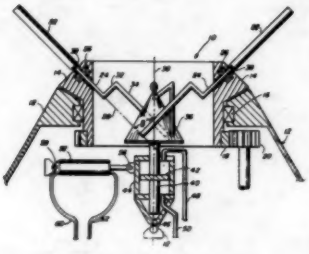
means for enabling the inserting and withdrawing of said pin from engagement with said outer shroud from outside of said cylinder.

4,957,413

OMNIDIRECTIONAL VARIABLE THRUST PROPELLER

Ronald S. Reich, and Richard W. Uhrich, both of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 28, 1986, Ser. No. 856,262
Int. Cl.[5] B63H *3/00*
U.S. Cl. 416—115 2 Claims



1. An omnidirectional variable thrust propeller for an undersea vehicle comprising:

a rotatable hub having a longitudinal axis;

a bearing rotatably supporting the hub in the undersea vehicle in the longitudinal axis;

a ring gear mounted on the hub and a pinion gear mounted on the undersea vehicle to rotate the hub via the ring gear;

a plurality of blades each rotatably mounted in bearing in the hub;

a plurality of shafts each having a lever and an inner end portion terminating inside the hub and, each shaft coaxially connected to a respective blade that is rotatably mounted in the hub at an acute angle to the longitudinal axis;

means mounted on the undersea vehicle and engaging the inner end portions of the blade shafts for reciprocably moving along the longitudinal axis of the hub to uniformly rotate blades in one direction when the reciprocable moving means moves longitudinally in one direction and to uniformly rotate the blades in an opposite direction when the reciprocably moving means moves longitudinally in an opposite direction thereby enabling change of the thurst force of the propeller, the reciprocably moving means includes:

a nut and screw combination;

a rod, one end of the rod being pivotally connected to the inner end portions of the shafts the other end of the rod being connected to the screw;

a sleeve mounted in a gimbal connection to the vehicle;

the nut being slidably mounted in the sleeve; and

a piston to reciprocably move the nut in said sleeve;

means mounted on the undersea vehicle for pivotally mounting the reciprocably moving means thereto at a point along the longitudinal axis of the hub to enable reciprocable movement thereof at an acute angle to the longitudinal axis of the hub; and

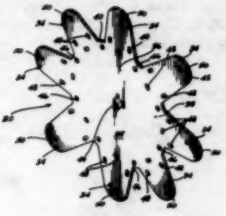
means mounted on the undersea vehicle for selectively moving the reciprocably moving means about a pivot point to change the direction of thrust by rotating the blades nonuniformly, longitudinal movement of the reciprocably moving means along the longitudinal axis varies the blade's thrust and pivotal movement of the reciprocably movable means changes the direction of thrust.

4,957,414

FAN AND HUB ASSEMBLY

Rainer O. Willingham, Tacoma, Wash., assignor to Flex-a-lite Consolidated, Tacoma, Wash.

Filed Dec. 29, 1988, Ser. No. 291,943
Int. Cl.[5] F04D *29/38*
U.S. Cl. 416—229 R 1 Claim



1. A method for producing a fan hub for supporting a plurality of molded plastic fan blades, comprising the steps of:

forming a disc-shaped body having opposing sides, an outside edge, and a plurality of arms;

forming a plurality of openings in said disc-shaped body for permitting fluid communication from said opposing sides to facilitate attachment of the fan blades to the hub;

forming one or more openings in each of said arms, the size and position of said openings being selected to establish a predetermined resonant frequency in an assembly consisting of said fan hub and said plurality of molded plastic fan blades, said predetermined resonant frequency being different than the frequency of periodic forces that act upon said assembly when said assembly operates in its intended environment; and

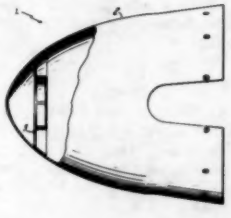
thereafter molding fan blades to said disc-shaped body.

4,957,415

POLYESTER COMPOSITE PROPELLER SPINNER AND METHOD OF MAKING SAME

Roy D. Paul, deceased, late of Windsor (by Janice W. Paul, executrix), and Walter Pollock, West Simsbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Continuation-in-part of Ser. No. 852,036, Apr. 14, 1986, abandoned. This application Nov. 12, 1987, Ser. No. 120,740
Int. Cl.[5] B29C *35/02*; B63H *1/20*
U.S. Cl. 416—245 R 3 Claims



1. An improved method for producing an impact hardened polyester composite propeller spinner having a conical wall, a plurality of radial internal support gussets, and means for attaching to a propeller hub, said method comprising combining a polyester resin with a plurality of glass fibers, molding to a final form, and curing, said improvement comprising:

(a) adding a vinyl terminated liquid reactive compound to said polyester resin, and

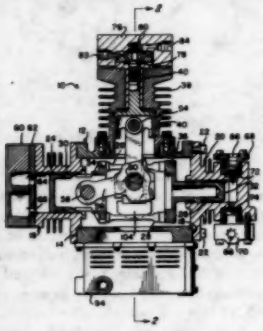
(b) combining said resin with about 35% by weight of a randomly oriented mixture of glass fibers having two fiber lengths, in a two to one ratio of long to short fibers respectively, said short fibers being about 5 cm in length and said long fibers being about 10 cm in length.

4,957,416

GAS COMPRESSOR

Bernard F. Miller, Corning, N.Y., and John A. Sawyer, Trout Run, Pa., assignors to Dresser-Rand Company, Corning, N.Y.

Filed Sep. 11, 1989, Ser. No. 405,249
Int. Cl.[5] F04B 5/00, 27/04
U.S. Cl. 417—273 9 Claims



1. A gas compressor, comprising:
a crankcase;
three cylinders, removably fastened to said crankcase, opening onto said crankcase;
a piston, reciprocably disposed, in each of said cylinders;
means for admitting gas into, and discharging gas from, each of said cylinders;
a crankshaft, having only a single crank, journalled in said crankcase;
first rod means connected to two of said pistons; and
second rod means connected to the other of said pistons; wherein
both said first and second rod means are coupled to said single crank to cause coincident reciprocation of said three pistons;
said first rod means comprises (a) a connecting rod, and (b) tie rods fastening said two of said pistons together;
said two of said pistons each has a head and a base, and at said base thereof, a radially-extending flange or skirt; and
said tie rods are fastened, at opposite ends thereof, to said flanges or skirts of said two of said pistons.

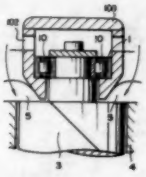
4,957,417

VERTICAL OILLESS SCREW VACUUM PUMP

Noboru Tsuboi, Kakogawa, Japan, assignor to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Jul. 14, 1989, Ser. No. 379,936
Int. Cl.[5] F04B 35/04; F01C 1/24
U.S. Cl. 417—423.13 2 Claims

1. A vertical oilless screw vacuum pump comprising: a pump unit comprising:
(a) a pump casing provided with a suction port in the upper portion thereof and a discharge port in the lower portion thereof,
(b) a set of vertically extending meshed male and female oilless screw rotors disposed within a rotor chamber formed in the casing and having rotor shafts supported for rotation at opposite ends thereof in roller bearings on the casing, and
(c) a pair of timing gears attached to lower ends of the rotor shafts of said male and female oilless screw rotors; and
a high frequency motor driven by high-frequency power, disposed under the pump unit and having a motor casing joined to a lower end of said pump casing, said high-frequency motor having a vertically extending output shaft;
wherein an upper end of the said output shaft of said high frequency motor is coupled directly with the lower end of one of said rotor shafts to drive the male and female oilless screw rotors directly, and wherein the motor casing contains a supply of oil such that said motor casing comprises an oil reservoir,



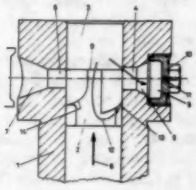
wherein the bearings supporting upper ends of the roller shafts are held in bearing casings having apertures, including a grease lubricating the bearings supporting upper ends of the rotor shafts, said grease having a vapor pressure below a desired ultimate vacuum to be achieved by the vertical oilless screw vacuum pump, wherein air flow can flow through said apertures such that the bearing supporting the upper ends of said rotor shafts are impinged by the air flow and are disposed in a suction flow path, and so are cooled.

4,957,418

INJECTION PUMP FOR INTERNAL COMBUSTION ENGINES

Anton Pischinger, Graz, and Theodor Stipek, Hallein, both of Austria, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Mar. 29, 1989, Ser. No. 330,389
Claims priority, application Fed. Rep. of Germany, Jun. 18, 1988, 3820706
Int. Cl.[5] F04B 7/04; F02B 3/00
U.S. Cl. 417—494 10 Claims



1. An injection pump for internal combustion engines, having a pump piston (2) in a pump bushing (1) a suction chamber (7) connected to said pump piston bushing, a connection (6) which connects said suction chamber to a work chamber (3) of the pump, said connection (6) is interrupted by the pump piston upon supply onset, and in which a diversion of the pump pressure at the end of supply is effected by re-opening a com-

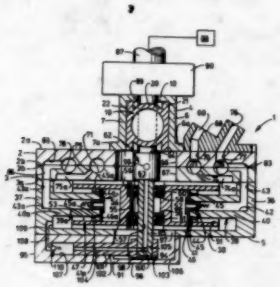
munication with the suction chamber, in which at least one separate diversion chamber (5), defined by a pressure maintenance means located in a wall portion separating said diversion chamber (5) from said work chamber (3) is connected to the work chamber (3) via a connection bore (4), said connection bore (4) is likewise openable and closable by the pump piston (2), and a connection of said connector bore (4) with the work chamber (3) is opened earlier, at the end of pump supply, than the connection (6) to the suction chamber (7).

4,957,419

COMPRESSOR

Anthony J. Rascov, 4304 Tobasco Rd., Cincinnati, Ohio 45244

Filed Apr. 14, 1989, Ser. No. 337,937
Int. Cl.[5] F04B *1/00*
U.S. Cl. 417—273 **8 Claims**



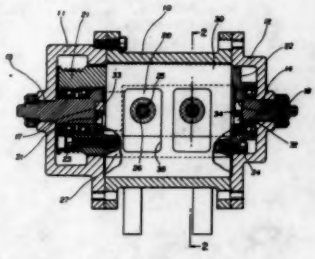
1. A compressor comprising first and second manifold plates having inner and outer surfaces, said manifold plates being joined together with their inner surfaces abutting in fluid tight fashion, first and second elongated cylinder housings each having side walls, end walls and an outer wall, said first and second cylinder housings being affixed in fluid tight fashion to the outer surfaces of said first and second manifold plates, respectively, and extending thereacross in directions oriented at 90° with respect to each other, first and second piston head/piston rod assemblies located in each of said cylinder housings, said first and second piston head/piston rod assemblies of each cylinder housing extending axially thereof from the cylinder housing ends in fixed and opposed relationship, first and second elongated sleeves located within said first and second cylinder housings, respectively, and being axially shiftable therein, each of said sleeves having an axial bore at each of its ends, each said axial bore receiving in fluid tight fashion one of said piston heads of its respective cylinder housing and forming a compression chamber therewith providing two compression chambers per cylinder housing, a crank comprising a crank element located in a central hole in said manifold plates and a pair of oppositely directed first and second crank pins each mounted on bearings in a central transverse hole in one of said sleeves located between said sleeve bores, means to impart rotation to said crank, said crank and its pins interconnecting said sleeves such that as said crank is rotated each crank pin rotates about its own axis and simultaneously reciprocates rectilinearly resulting in reciprocation of its respective sleeve within its respective cylinder housing providing an intake stroke and a compression stroke in sequence for each said four compression chambers, an intake port and an outlet port for said compressor, means to introduce fluid from said inlet port to each compression chamber during its intake stroke and means to deliver pressurized fluid from each compression chamber during its compression stroke to said outlet port.

4,957,420

VANE PUMP WITH GUIDE MEANS FOR REGULATING MOVEMENT OF VANE

Shoichi Furuhama, Tokyo, Japan, assignor to Nippon Piston Ring Co., Ltd., Tokyo, Japan

Filed Apr. 11, 1989, Ser. No. 336,082
Claims priority, application Japan, Apr. 27, 1988, 63-102496
Int. Cl.[5] F04C *18/344*
U.S. Cl. 418—255 **6 Claims**



1. A vane pump comprising a center housing, front and rear housings holding said center housing therebetween, a rotor eccentrically disposed in said center housing and rotatably supported by said front and rear housings, a single vane diametrically movably inserted in said rotor, a plurality of bolts and spacers, and guide means for regulating the projection of said vane out of said rotor,

said guide means comprising an axle provided centrally on each side of said vane, a circular hole formed in the inner surface of each of said front and rear housings to receive said axle and having a center just in the middle between the centers of said rotor and said center housing, and a roller bearing interposed between said axle and said circular hole to guide said axle in a circular path with a diameter equal to the eccentric radius of said rotor,

said center housing having an inner surface with a cross-sectional profile that is firstly drawn by the tip of said vane when said rotor turns and then expanded by a preselected clearance,

said front and rear housings being respectively provided with front and rear shafts axially aligned with said rotor,

said rotor having front and rear blocks rotatably fitted on said front and rear shafts,

said rotor having a pair of generally semicylindrical bodies joined to each other with the intervention of said front and rear blocks to form a vane groove therebetween, and

said vane being centrally formed with a long hole having the plurality of bolts and spacers positioned therein to maintain said vane groove.

4,957,421

METAL TREATMENT

Alfonso L. Baldi, Wynnewood, Pa., assignor to Alloy Surfaces Company, Inc., Wilmington, Del.

Continuation-in-part of Ser. No. 289,595, Dec. 22, 1988, Ser. No. 205,387, Jun. 10, 1988, Pat. No. 4,895,609, Ser. No. 182,718, Apr. 18, 1988, Ser. No. 28,741, Mar. 23, 1987, Pat. No. 4,927,798, Ser. No. 96,368, Sep. 11, 1987, Pat. No. 4,880,483, Ser. No. 862,712, May 13, 1986, Pat. No. 4,871,708, Ser. No. 707,656, Mar. 4, 1985, Pat. No. 4,824,482, Ser. No. 685,910, Dec. 27, 1984, Pat. No. 4,920,362, Ser. No. 584,538, Feb. 28, 1984, Pat. No. 4,845,139, and Ser. No. 538,541, Oct. 3, 1983, Pat. No. 4,830,931, each is a continuation-in-part of Ser. No. 632,016, Jul. 18, 1984, abandoned, Ser. No. 571,510, Jan. 17, 1984, Pat. No. 4,537,927, Ser. No. 554,441, Nov. 22, 1983, abandoned, Ser. No. 488,103, Apr. 25, 1983, Pat. No. 4,615,920, Ser. No. 417,214, Sep. 13, 1982, abandoned, Ser. No. 281,405, Jul. 8, 1981, Pat. No. 4,708,913, and Ser. No. 172,671, Jul. 28, 1980, Pat. No. 4,435,481. This application Apr. 10, 1989, Ser. No. 335,240

Int. Cl.[5] B22F 7/00

U.S. Cl. 419—8 10 Claims

1. The process of preparing a pyrophorically modified foil, in which process a metal foil about 0.02 to about 0.05 millimeters thick has applied to its surface a layer of a mixture of powdered aluminum, iron and nickel which is then heated to cause the powders to inter-react without materially degrading the foil, to form iron and nickel aluminides having at least twice as many aluminum atoms as nickel and iron atoms and sintered to the foil, and the resulting foil is leached to remove some of the aluminum from the aluminides and thus to develop pyrophoricity.

4,957,422

APPARATUS FOR THE MANUFACTURE OF SECTIONS OF THERMOPLASTIC RESIN REINFORCED WITH CONTINUOUS FIBERS

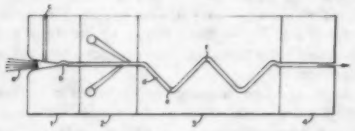
Michel Glemet, Serguigny, and Gilles Cognet, Bernay, both of France, assignors to Societe Atochem, Puteaux, France

Division of Ser. No. 176,854, Apr. 4, 1988, Pat. No. 4,883,625. This application Sep. 11, 1989, Ser. No. 405,551

Claims priority, application France, Apr. 9, 1987, 87 04996

Int. Cl.[5] B29C 47/02

U.S. Cl. 425—114 3 Claims



1. An apparatus for the manufacture of articles of thermoplastic resin reinforced with continuous fibers which comprises a channel including a coating zone having means for coating the continuous fibers and a shaping zone downstream of said coating zone and having means for shaping the articles, wherein a baffle zone is provided upstream of and in communication with the coating zone, said baffle zone comprising a baffle channel portion and at least one baffle extending substantially transversely into said baffle channel portion; and between the coating zone and the shaping zone, there is an impregnation zone in alignment with the exit of the coating zone and the entrance of the shaping zone, and having at least two baffles opposite to, and parallel with, each other, and extending substantially transversely into the channel; wherein the at least one baffle of the first baffle zone is substantially parallel to the at least two baffles of the impregnating zone.

4,957,423

SEPARATOR MANUFACTURING APPARATUS

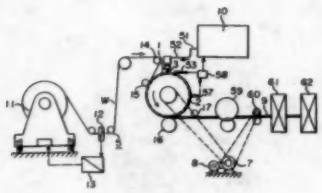
Hisao Yokoya, Nakatsugawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 251,365, Sep. 30, 1988, Pat. No. 4,897,026. This application Nov. 1, 1989, Ser. No. 430,786

Claims priority, application Japan, Oct. 1, 1987, 62-248414; Oct. 1, 1987, 62-248413; Oct. 26, 1987, 62-269775; Oct. 26, 1987, 62-269774; Oct. 26, 1987, 62-269773

Int. Cl.[5] B29C 31/04

U.S. Cl. 425—115 15 Claims



1. A separator manufacturing apparatus which comprises:

a transfer roller with a plurality of annular shaping grooves having a predetermined shape in cross section which are formed in the outer circumferential surface of said roller in its circumferential direction,

a resin feeding device with a nozzle means to feed a hot-melt type resin having high adhesion properties to said annular shaping grooves of the transfer roller,

a base paper feeding device to feed a continuous paper at a predetermined speed to a part of said outer circumferential surface of the transfer roller supplied with said resin to thereby form by transfer a plurality of ribs having a predetermined shape corresponding to the annular shaping grooves on a surface of said continuous paper, and

a resin drop receiving device to receive resin drops from said nozzle means of the resin feeding device before feeding said resin to said annular shaping grooves.

4,957,424

CONCRETE PIPE MAKING MACHINE

William J. Mitchell, Charles City, and Navarro T. Fosse, Nashua, both of Iowa, assignors to Hydrotile Machinery Company, Nashua, Iowa

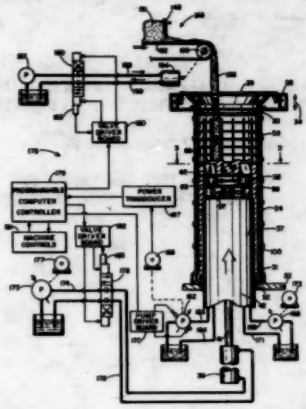
Filed Mar. 13, 1989, Ser. No. 322,175

Int. Cl.[5] B28B 21/28

U.S. Cl. 425—145 48 Claims

45. A core and counter rotating packerhead assembly for a concrete pipe making machine comprising: a core having an axis, a side wall, and a top wall surrounding a chamber, vibrator means located within said chamber, means mounting the vibrator means on the side wall of the core whereby the vibrator means vibrates said side wall, counter rotating packerhead means located adjacent said top wall of the core, shaft means mountiing the packerhead means on the core for rotation about the axis of the core, said packerhead means, comprising a first means for working concrete generally into the shape of a concrete pipe, second means for working the concrete after the

first means has worked the concrete, and drive means mounted on the core and located in said chamber for rotating the shaft



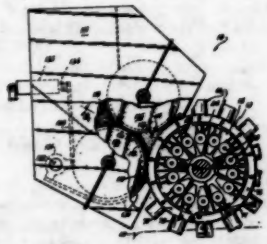
means to turn the first means in a first circumferential direction and turn the second means in a second circumferential direction opposite the first circumferential direction.

4,957,425

APPARATUS FOR PRODUCING SHAPED PRODUCTS

Rudolph J. Fay, 6911 Wildflower Trail, Cincinnati, Ohio 45230

Filed May 15, 1989, Ser. No. 352,404
Int. Cl.[5] B29C *43/50*
U.S. Cl. 425—362 **23 Claims**



8. A machine for producing configurated products comprising

a rotary die roll having an open interior and cavities arranged in a series of longitudinal rows and circumferential columns,

movable dies disposed in each of said cavities, said dies being made from a porous material,

means for introducing product into said cavities,

means for ejecting said product from said cavities, said ejection means comprising

means for moving said dies outwardly in said cavities until the outer surfaces of said dies are approximately flush with the surface of said roll,

gas supply means for supplying gas at a regulated pressure to the underside of said porous material dies as said dies are moved outwardly in said die cavities, said gas being operable to eject said product from said dies and to prevent said product from sticking to and clogging the pores of said dies, and

means for independently adjusting and presetting the gas pressure supplied to the underside of each of said porous material dies so as to enable the pressure supplied to all of said porous material dies to be equalized.

16. A machine for producing configurated products comprising

a rotary die roll having an open interior and cavities arranged in a series of longitudinal rows and circumferential columns,

movable dies disposed in each of said cavities, said dies being made from a porous material,

first means for introducing a first, non-moldable solid product into said cavities,

second means for introducing a second moldable product into said cavities downstream of said first introducing means,

means for ejecting said product from said cavities, said ejection means comprising

means for moving said dies outwardly in said cavities until the outer surfaces of said dies are approximately flush with the surface of said roll, and

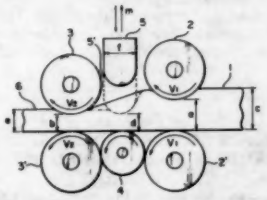
gas supply means for supplying gas at a regulated pressure to the underside of said porous material dies as said dies are moved outwardly in said die cavities, said gas being operable to eject said product from said dies and to prevent said product from sticking to and clogging the pores of said dies.

4,957,426

APPARATUS FOR STRETCHING DOUGH

Torahiko Hayashi, Tochigi, Japan, assignor to Rheon Automatic Machinery Co., Ltd., Utsunomiya, Japan

Filed Feb. 6, 1989, Ser. No. 307,123
Claims priority, application Japan, Feb. 15, 1988, 63-32357
Int. Cl.[5] A21C *3/02*
U.S. Cl. 425—367 **13 Claims**



1. In an apparatus for stretching an elongated dough body having a length and a thickness, said apparatus having:

(a) an upstream pair and a downstream pair of rollers, each pair of said rollers positioned and spaced apart from each other to provide a path for the dough body and rotating in the same direction where they face each other and at the same peripheral speed,

(b) means for adjusting the space between said rollers in each pair so that the space between said upstream pair of rollers is wider than the space between said downstream pair of rollers, the space between said upstream rollers being less than the thickness of the dough body upstream of said upstream pair of rollers, and the space between said downstream rollers being less than the thickness of the dough body located between said upstream pair and downstream pair of rollers.

(c) means for driving said upstream pair and said downstream pair of rollers so that the peripheral speed of said upstream pair of rollers is slower than that of said downstream pair of rollers, thereby imparting a tensile pressure along the length of the dough body,

the improvement comprising:

means for imparting vibrations to a portion of the dough body, said means positioned between said upstream pair and said downstream pair of rollers, said imparted vibra-

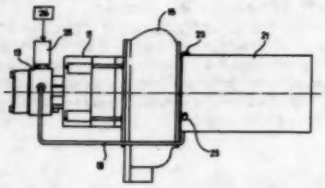
tions having an amplitude and a frequency such that a thixotropic effect occurs in the portion of the dough body, thereby allowing stretching of the dough body with said tensile pressure lower than the pressure at which the dough loses its elasticity.

4,957,427

LIQUID FUEL PURIFYING BURNER

Jörg Füllemann, Mastrils, and Heinrich Boner, Malans, both of Switzerland, assignors to VTH AG Verfahrenstechnik Fur Heizung, Liechtenstein

Filed Mar. 11, 1988, Ser. No. 167,300
Claims priority, application Switzerland, Mar. 13, 1987, 958/87
Int. Cl.[5] F23Q *3/00*
U.S. Cl. 431—265 **42 Claims**



1. A burner comprising
a rotating gasifier (17), said gasifier including
a hollow body rotating at high speed,
an inlet (53) for air into the hollow body, and
an outlet (55) from the inside of the hollow body for a gas/air mixture;
means (13, 25, 19) for supplying fuel to the interior of the hollow body of the gasifier (17);
a drive means (11) for rotating the gasifier (17); and
means (21) external of the hollow body for the recirculation of hot combustion gases from the outlet (55) to the inlet (53).

4,957,428

PROCESS FOR CONSTRUCTING FURNACES WITH OPEN CHAMBERS, FOR AVOIDING DEFORMATION THEREOF

Aristide Valassopoulos, Aix en Provence; Jean-Claude Thomas, St. Germain en Laye, and Christian Dreyer, St. Jean de Maurienne, all of France, assignors to Aluminium Pechiney, Paris, France

Filed Mar. 23, 1989, Ser. No. 327,703
Claims priority, application France, Apr. 8, 1988, 88 05251
Int. Cl.[5] F27D *7/00*
U.S. Cl. 432—3 **4 Claims**

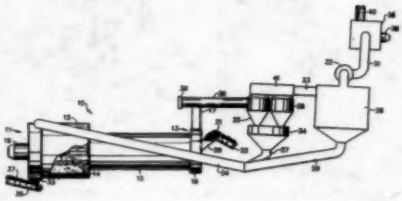
1. A process for constructiing a furnace with open chambers for baking carbonaceous blocks, comprising arranging a plurality of chambers in a series or in two parallel series, each chamber being defined by lateral partitions and transverse partitions, disposing the plurality of chambers within an independent concrete casing structure formed by a floor and lateral wall portions having disposed thereon a plurality of vertical buttresses and compressively prestressing said vertical buttresses in the vertical direction.

4,957,429

METHOD AND APPARATUS FOR REMOVING VOLATILE HYDROCARBONS FROM PARTICULATE SOILS

Robert L. Mendenhall, 1770 Industrial Rd., Las Vegas, Nev. 89102

Filed Aug. 18, 1989, Ser. No. 395,604
Int. Cl.[5] F23G *5/20*; F27B *15/12*
U.S. Cl. 432—14 **19 Claims**



1. A continuous method of removing a volatilizable organic composition from a particulate mineral composition containing said organic composition comprising:
introducing hot gases of combustion into a first end of a rotatable drum and directing said hot gases toward a second of said drum end,
introducing said particulate mineral composition comprising a mixture of coarse and fine particles into said drum adjacent said second end and rotating said drum and exposing said particles to said hot gases while advancing said particles toward said first end,
removing a gaseous composition from said drum comprising a mixture of said gases of combustion, volatilized organic composition, and fine particles of said mineral composition at said second end,
separating the fine particles of said mineral composition from said gaseous composition,
directing fine particles separated from said gaseous composition into said drum at a location along a drum length between said first and second second ends, mixing the fine particles with coarse particles advancing toward said first end, and continuing to heat the mixed fine and coarse particles until the concentration of volatilizable organic composition therein is less than about 100 parts per million, and
recovering a mixture of coarse and fine mineral composition particles adjacent said first end,

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4,957,430

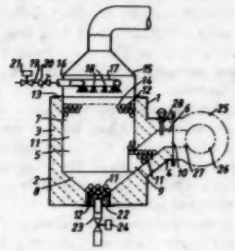
LMITING THE PRESENCE OF THE OXIDES OF NITROGEN IN REGENERATIVE HEATING SYSTEMS

James H. Goodfellow, Dewsbury, England, assignor to British Gas plc, London and Hotwork Developments Ltd., West Yorishire, both of, England

Continuation of Ser. No. 227,517, Aug. 2, 1988, abandoned, which is a continuation of Ser. No. 96,284, Sep. 14, 1987, Pat. No. 4,768,949. This application Oct. 6, 1989, Ser. No. 420,609
Claims priority, application United Kingdom, Dec. 19, 1985, 8531277; Feb. 20, 1986, 8604168
Int. Cl.[5] F27D *17/00*; F27B *15/00*; F23D *13/20*
U.S. Cl. 432—28 **3 Claims**

1. A method for limiting the amount of nitrogen oxides in exhaust gas from a regenerator by causing water vapor to enter

a combustion chamber of the regenerator during a firing phase in a form in which the water vapor is entrained in preheated combustion air, the method comprising injecting water or water vapor into the combustion air at a point upstream of the



preheated storage bed with respect to the direction of movement of the combustion air so that the water or water vapor reaches the combustion chamber by way of the heat storage bed.

4,957,431

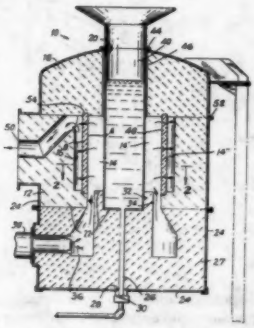
HEATING MANTLE WITH A POROUS RADIATION WALL

Meng-Teck Eng, Wayne, and H. Kenneth Staffin, Colonia, both of N.J., assignors to Gas Research Institute, Chicago, Ill.

Filed Jan. 1, 1989, Ser. No. 359,973

Int. Cl.[5] F27B *3/20*

U.S. Cl. 432—31 **12 Claims**



1. A heating mantle for heating materials comprising:

a. material holding means for holding said material;

b. a housing defining a chamber which substantially surrounds said material holding means;

c. a source of hot gases constructed and arranged for supplying hot gases through said chamber in a preselected path;

d. porous wall means defined between a first face directed toward said material holding means, and an opposed second face and disposed in said chamber in said path with said gases entering said porous wall means through said first face for receiving heat from said hot gases, said first face radiating heat toward said material holding means wherein said gases flow from said first face to said second face; and

e. means for exhausting said gases after said gases passed through said second face.

4,957,432

FORCED JET CONVECTION OVEN FOR VACUUM BAGGING

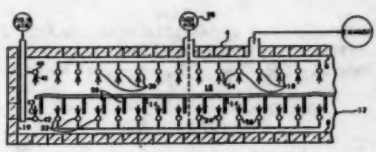
Duane M. Rachal, and James R. Krone, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 91,815, Sep. 1, 1987, Pat. No. 4,915,896. This application Aug. 23, 1989, Ser. No. 397,227

Claims priority, application Canada, May 10, 1988, 566394

Int. Cl.[5] F27B *5/16*

U.S. Cl. 432—59 **15 Claims**



1. Apparatus comprising:

(a) an oven having an inside ceiling, inside floor, and an inside outer perimeter extending between an outer edge of the ceiling and an outer edge of the floor;

(b) a support having an upper surface suitable for supporting a panel, said support means being positioned in the oven with the upper surface of the support means being spaced apart from the ceiling of the oven to define a panel-receiving chamber between the upper surface of the support means and the ceiling of the oven;

(c) a first manifold means positioned between the upper surface of the support means and the ceiling of the oven, said first manifold means having a first multiplicity of outlets directed in the direction of the upper surface of the support means; and

(d) a second manifold means positioned between the upper surface of the support and the floor of the oven, said second manifold means having a second multiplicity of outlets directed in the direction of the upper surface of the support means;

wherein the support means comprises a plurality of parallel bars mounted across the oven floor, portions of the second manifold means are positioned between and below the parallel bars, and the first manifold means and the second manifold means each comprise a plurality of branches extending in a direction generally parallel to the plurality of parallel bars forming the support means.

4,957,433

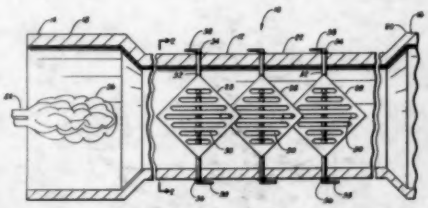
DRUM BAFFLE

George W. Swisher, Jr., Oklahoma City, Okla., assignor to CMI Corporation, Oklahoma City, Okla.

Filed May 15, 1989, Ser. No. 351,395

Int. Cl.[5] F27B *7/14*

U.S. Cl. 432—103 **6 Claims**



1. In a drum used for heating solid material being veiled through the drum with hot gases of combustion flowing through the drum, the improvement comprising:

at least one baffle in the drum; and

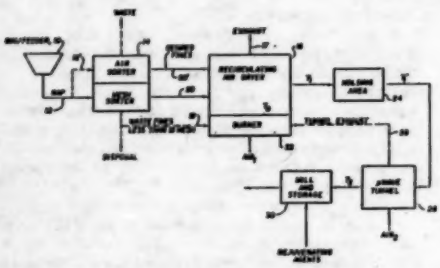
means for pivoting the baffle within the drum generally between a first position in which the baffle is parallel to the normal flow of the gases of combustion through the drum and a second position in which the baffle is perpendicular to the normal flow of the gases of combustion through the drum, wherein the means for pivoting the baffle comprising a shaft extending transversely across the drum and pivotally secured within the drum, said baffle being secured to said shaft and extending perpendicular to the axis of said shaft; and means for turning said shaft.

4,957,434

METHOD AND APPARATUS FOR TREATING ASPHALTIC CONCRETE PAVING MATERIALS

John Radomsky, Cedar Park, Tex., assignor to Cyclean, Georgetown, Tex.

Filed Dec. 20, 1985, Ser. No. 811,364
Int. Cl.[5] F27B *7/36*
U.S. Cl. 432—103 **33 Claims**



1. A method for heating reclaimed asphaltic concrete paving comprising the following steps in combination:

placement of the reclaimed asphaltic pavement RAP in an impingement air sorter for removing fine particles which are smaller than a predetermined size;

a first heating step comprising heating the remaining asphaltic paving in a recirculating air dryer to a first predetermined temperature; and

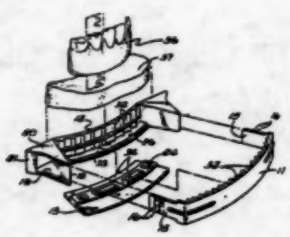
a second heating step comprising heating said reclaimed asphaltic concrete in a microwave tunnel to a second predetermined temperature.

4,957,435

DENTAL LABORATORY DIE TRAY

Vasik N. Jinoian, Obermumph, Switzerland; Ray E. Morrow, and Wayne W. Whitehill, both of Arcadia, Calif., assignors to Vident, Inc., Baldwin Park, Calif.

Filed Oct. 6, 1988, Ser. No. 254,441
Int. Cl.[5] A61C *19/00*
U.S. Cl. 433—34 **11 Claims**



1. In a dental laboratory die tray, the combination of:

a first side member;

a second side member; and

a bottom member;

said first and second side members having first integrally formed interengaging means for releasably joining said first and second side members to form a housing with an open top and an open bottom and defining a space for a dental model, with said side members movable toward and away from each other, and with said first interengaging means including means defining a housing closed position and a housing partially closed position independently of said bottom member,

with said side members separable from each other in a housing open position, and with said bottom member holdable between said side members when said side members are in said closed position and with said bottom member released from said side members when said side members are in said partially closed position, and

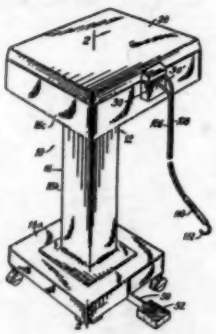
said bottom member and said first and second side members having second integrally formed interengaging means for releasably joining said bottom member to said side members for closing said open bottom of said housing with said bottom member removable from and replaceable in between said side members when said side members are in said partially closed position.

4,957,436

DENTAL PUMP SYSTEM FOR CHEMICAL CARIES REMOVAL

Francis E. Ryder, Arab, Ala., assignor to National Patent Development Corporation, New York, N.Y.

Filed Mar. 28, 1986, Ser. No. 845,645
Int. Cl.[5] A61C *3/02*
U.S. Cl. 433—88 **19 Claims**

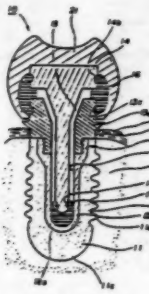


1. A fluid dispensing apparatus for a flexible container having an outlet opening; said apparatus comprising a frame, a first wall member mounted to said frame; a first container impinging means mounted to said frame in facing relation to said first wall member for movement toward and away from said first wall member respectively; a heater means mounted to said frame for maintaining the fluid in said container at a predetermined temperature; and drive means for actuating said first container impinging means between a first condition wherein it is urged toward said first wall member for squeezing the container therebetween to urge the liquid therefrom through said outlet opening and a second condition wherein said container impinging member is in a retracted position state relative to said wall member for permitting said container to return to a relaxed state for maintaining the liquid therein, said drive means comprising resilient means for normally urging said container impinging means toward said wall member and selectively actuatable release means for driving said impinging means against said resilient means and away from said wall member.

4,957,437
ARTIFICIAL TOOTH

Kaizo Shimura, Yokosuka; Hiroyasu Takeuchi, Tokorozawa; Masahiro Hirano, Yokozemachi, and Yohji Imai, Chiba, all of Japan, assignors to Mitsubishi Mining & Cement Co., Ltd., Tokyo, Japan

Filed Feb. 16, 1989, Ser. No. 311,539
Claims priority, application Japan, Feb. 23, 1988, 63-38752
Int. Cl.[5] A61C *13/28*
U.S. Cl. 433—169 10 Claims



1. An artificial tooth comprising a contacting member formed of a composite material having compatibility with living tissues and disposed at an outer portion of the artificial tooth to be contacted with alveolar bone, a metal base member having an opening therein and disposed inside of and attached to said contacting member, a metal post inserted into said opening of the metal base member and at least two elastic buffer members disposed in a space between said metal base member and said metal post, said composite material having compatibility with living tissues containing 40 to 95% by weight of a calcium phosphate compound and 60 to 5% by weight of an organic polymer, each of said elastic buffer members being spaced apart for movably receiving said metal post by which pressure imposed upon the artificial tooth is transmitted, said metal base member being constituted by an upper section and a lower section removably connected to each other.

4,957,438
DENTAL COUPLING ASSEMBLY AND METHOD FOR ITS USE

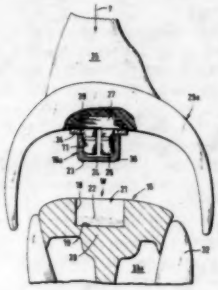
Arthur Bax, Schilde, Belgium, assignor to CEKA N.V., Antwerpen, Belgium

PCT No. PCT/DE87/00547, § 371 Date Jul. 12, 1988, § 102(e) Date Jul. 12, 1988, PCT Pub. No. WO88/03786, PCT Pub. Date Jun. 2, 1988
PCT Filed Nov. 25, 1987, Ser. No. 236,360
Claims priority, application Fed. Rep. of Germany, Nov. 25, 1986, 3640163; Mar. 9, 1987, 3707483; Nov. 23, 1987, 3739646
Int. Cl.[5] A61C *13/225*
U.S. Cl. 433—180 10 Claims

1. A dental coupling assembly, comprising:

a holding member having a body anchorable in a mouth and formed with an undercut-free recess opening at a face of said body, said recess being bounded by a right-circularly cylindrical internal wall directly adjoining a circular bottom wall of said recess, said bottom wall continuously spanning across a bottom of said recess, said right-circularly cylindrical wall being peripherally continuous and extending straightly over substantially a full depth of said recess from a junction with said bottom wall to said face;

a retention member connectable to a dental prosthesis and formed with a plug on one side of said retention member, said plug being received in said recess and having a right-circularly cylindrical peripherally continuous external wall extending straightly from an end of said plug to a level of said face and juxtaposed with said internal wall across an all-around cylindrical gap, said plug having a circular continuous end wall spanning continuously across said end, forming a junction with said external wall and spaced from said bottom wall across a circular gap communicating with said cylindrical gap;



a mass of adhesive displaced by said plug to fill said gaps and settable to bond said members together while filling said gaps; and

means for securing a dental prosthesis to an opposite side of said retention member.

4,957,439
PREFABRICATED DENTAL PONTIC, PONTIC CONNECTOR AND ASSEMBLY

Itzhak Shoher, 50 Shlomo-Hamelech St., Tel-Aviv, Israel 64386, and Aharon E. Whiteman, 13 J.L. Perez St., Petach-Tikvah, Israel 49206

Filed Sep. 17, 1987, Ser. No. 97,824
Int. Cl.[5] A61C *13/12*
U.S. Cl. 433—180 11 Claims

1. A prefabricated structure for forming a pontic for joining metal retainer(s) mounted on an abutment tooth or teeth adjacent an edentulous space to be filled with the pontic in the fabrication of a bridge comprising: a metal body having open spaces in said body and having a mesiodistal dimension shorter than the span between the abutment teeth separating the edentulous space and an arm extending from said metal body, said arm having a free end for engaging said metal retainer at the interproximal and a trough-like channel extending from said free end with said trough-like channel having a depth in the occluso-gingival direction greater than at least about 0.5 mm such that the trough-like channel formed by said arm permits solder to collect, flow and fill into the channel for forming a reinforced solder joint upon soldering said arm to said retainer.

4,957,440
PROCESS FOR PREPARING NONSHRINKING PORCELAIN OPAQUE COVERING FOR DENTAL APPLIANCES

Robert B. Hankins, 1011 W. 34th St., Austin, Tex. 78705, and Reid B. Green, 1801 Wells Branch Pkwy., Apt. 409, Austin, Tex. 78728

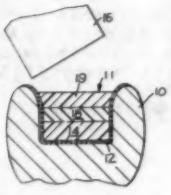
Filed Aug. 7, 1986, Ser. No. 893,920
Int. Cl.[5] A61C *5/08, 13/83;* B29C *33/52*
U.S. Cl. 433—201.1 1 Claim

1. A process for applying an opaque covering to the metal casting of a metal-ceramic dental restoration which comprises:
(a) mixing about 7 parts by weight powdered opaque porcelain with about 3 parts by weight molten wax;
(b) heating the resulting mixture to a temperature approximately 2 to 5° C. above the melting point of the wax used in forming the mixture;
(c) applying the heated mixture to a metal casting forming the base of a dental restoration using an instrument heated to a temperature approximately 2 to 5° C. above the melting point of the wax used in forming the mixture;
(d) substantially vaporizing the wax from the mixture by heating the coated casting to about 600° C. for about 10 minutes; and
(e) firing the remaining porcelain in a vacuum oven at approximately 980° C. for about 10 minutes.

4,957,441
METHOD OF ENHANCING THE CURING OF A PHOTOCURABLE DENTAL RESTORATIVE MATERIAL

Thomas T. Bryan, Mahtomedi, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 20, 1988, Ser. No. 287,003
Int. Cl.[5] A61K *5/01*
U.S. Cl. 433—228.1 22 Claims



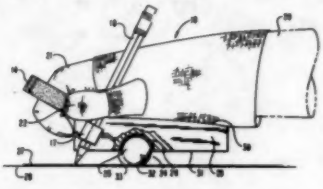
1. Method of enhancing the cure of a photocurable restorative material comprising the steps of:
(a) applying to a dental substrate or model thereof a coating comprising an amount, sufficient to increase the hardness of the underside of a photocurable dental restorative after photocuring, of a fluorescent material that, when exposed to radiant energy, fluoresces at a wavelength at which the restorative material photocures,
(b) applying a thin layer of the restorative material over the coating, and
(c) exposing the layer to radiant energy of said wavelength to photocure the restorative material.

4,957,442
APPARATUS AND METHOD FOR ASSISTING A DISABLED PERSON TO HAND WRITE WITH A WRITING INSTRUMENT

Stephen J. Prater, 444 S. Fenton Ave., Indianapolis, Ind. 46219

Filed Oct. 24, 1989, Ser. No. 425,943
Int. Cl.[5] G09B *11/00;* B43L *13/00, 15/00*
U.S. Cl. 434—166 17 Claims

1. An apparatus for assisting the disabled to handwrite, said apparatus comprising:
a stabilizing weight member having a top side and a bottom side, and a roller ball socket in said bottom side;
a roller ball rotatably mounted in said roller ball socket;
writing instrument holder means attached to said weight member, said holder means being for holding a writing instrument so that the writing end of said instrument extends beyond said bottom side;



said writing instrument holder means includes a holder protrusion extending from the side of said weight member, said holder protrusion having a writing instrument passageway; and
hand attachment means mounted to the top side of said weight member, said hand attachment means being for attaching said weight member to a hand.

4,957,443
EDUCATIONAL CARD GAME SYSTEM

Franklin B. Schwartz, 848 E. 28 St., C-9, Brooklyn, N.Y. 11210

Filed Jan. 5, 1989, Ser. No. 293,702
Int. Cl.[5] G09B *19/00;* A63F *1/00*
U.S. Cl. 434—188 30 Claims

1. An educational card game for entertaining a number of players comprising a deck of cards, a first definition of statements to be considered valid for the purposes of the game, and a set of rules such that:
(a) each card of said deck has a first face identical to said first face of each other card in said deck, and a second face on which a representation appears in a first direction, and a representation appears in a second direction which is 180 degrees rotated from said first direction,
(b) each card of said deck carrying on said second face in said first direction a representation of a first binary relation carries on said second face in said second direction a representation of a binary relation which is the mathematical inverse of said first binary relation,
(c) each card of said deck carrying on said second face in said first direction a representation of a first binary function carries on said second face in said second direction a representation of a second binary function which, when applied to the same two arguments as said first binary function with the order of said same two arguments reversed when said second binary function is applied to them, produces the same result as said first binary function produces when applied to said same two arguments in their original order,
(d) each card of said deck carrying on said second face in said first direction a representation of a unary function carries on said second face in said second direction a representation of the same unary function,
(e) there exist in said deck at least two cards each of which carries on said second face in said first direction a representation of a binary relation and/or a binary function,

(f) there exists in said deck at least one card carrying on said second face in said first direction a representation of a binary relation which does not appear on said second face of same card in said second direction,

(g) for each card in said deck which carries on said second face a unary function there exists at least one other card of said deck which carries on said second face the mathematical inverse of that unary function,

(h) each card of said deck carrying on said second face in said first direction a representation of a first concept that is not a binary relation, not a binary function, and not a unary function, carries on said second face in said second direction a representation of a concept which if different from said first concept differs only for grammatical purposes,

(i) each statement defined by said first definition of statements can be represented in at least one direction using representations carried on said second faces of at least two cards of said deck,

(j) no card of said deck carries on said second face any representation not useful for the purpose of representing a portion of at least one statement defined by said first definition of statements,

(k) whenever any statement defined by said first definition of statements is represented in said first direction using representations carried on said second faces of cards of said deck, a statement defined by said first definition is represented in said second direction using representations carried on said second faces of same cards of said deck, and

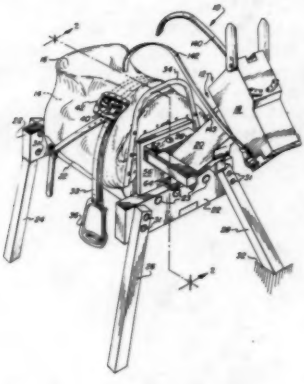
(l) whenever any statement defined by said first definition of statements is represented in said second direction using said second faces of cards of said deck, a statement defined by said first definition is represented in said first direction on said second faces of same cards of said deck.

4,957,444

TRAINING HORSE SIMULATOR

Seth A. Armen, Weston, Conn., assignor to Pegasus Therapeutic Riding, Inc., Darien, Conn.

Filed Nov. 17, 1988, Ser. No. 272,705
Int. Cl.[5] G09B *19/00*; A63G *19/00*; A63B *69/00*
U.S. Cl. 434—247 **8 Claims**



1. A horse simulator for training a person to ride a horse, comprising:

a barrel for simulating a horse's back, an upper surface of the barrel being shaped to form a seat;

a support frame for supporting the barrel above a floor;

a head assembly that simulates a horse's neck and head;

a pivot mount pivotally attaching the head assembly to an end of the barrel;

a bit simulator mounted to the head assembly;

right and left reins attached to the bit simulator;

means incorporated in the bit simulator for generating a stop signal;

means incorporated in the pivot mount for generating a right and left turn signals;

means attached to the barrel for generating a pressure signal indicative of when sufficient pressure is applied by the person to the barrel; and

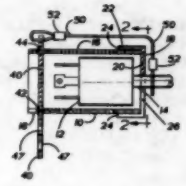
an indicator light coupled to the pressure signal generating means for actuation by the pressure signal, the indicator light mounted on the head assembly.

4,957,445

LOCK-OUT ENCLOSURE FOR POWER CONNECTOR

Ronald A. Burke, Jr., 6650 Loud Dr., Oscoda, Mich. 48750

Filed Apr. 18, 1989, Ser. No. 339,645
Int. Cl.[5] H01R *13/44*
U.S. Cl. 439—134 **23 Claims**



1. An enclosure for a connector attached to a power supply line comprising:

a tube sized to be slipped over said connector;

a cap connectable to one end of said tube, said cap having an end wall, a cylindrical flange extending from said end wall, and a slot extending through said cylindrical flange to a central area of said end wall, said slot having a transverse width sufficient to receive said power supply line therethrough; and

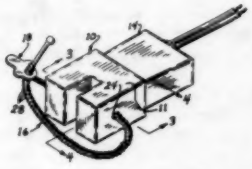
an adhesive binding said cylindrical flange of said cap to said one end of said tube to lock said enclosure to said connector.

4,957,446

LOCKOUT DEVICE FOR ELECTRICALLY OPERATED EQUIPMENT AND DEVICES

Ronald R. Belsky, 3922 W. Good Hope Rd. #5, Milwaukee, Wis. 53209

Filed Dec. 11, 1989, Ser. No. 448,696
Int. Cl.[5] H01R *13/44*
U.S. Cl. 439—134 **9 Claims**



1. A lockout device for preventing the use of electrically operated equipment having a power cord with an electrical plug and at least two prongs, each of which are attached to and extending from the plug and terminating in an exposed end, each prong having a hole spaced from its exposed end, said device comprising:

a housing defining a first passageway, with one end of said passageway terminating in an opening disposed on an end

of said housing, the other end of said passageway terminating in an end wall within said housing, said housing defining a second passageway, said second passageway disposed substantially perpendicular to and intersecting said first passageway, said first passageway having a cross-sectional dimension sufficient to accept the prong of the electrical plug, whereby the prong of the electrical plug may be disposed in said first passageway, with the hole in the prong disposed in said second passageway, wherein said second passageway passes through each of said first passageways and said second passageway terminates in a pair of openings on substantially opposite sides of said housing; and

a latching means extending through said second passageway and through the hole in the prong so that removal of the prong from said first passageway is prevented, and said latching means having a securing means to prevent its removal from said second passageway.

4,957,447

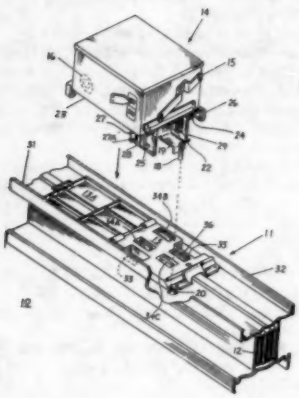
ELECTRIC POWER BUSWAY PLUG ALIGNMENT ARRANGEMENT

David A. Hibbert, South Windsor, Conn.; Lynn M. Hartog; John D. Anderson, both of Selmer, Tenn., and Anthony L. Richards, Southington, Conn., assignors to General Electric Company, Plainville, Conn.

Filed Aug. 31, 1989, Ser. No. 401,306

Int. Cl.[5] H01R *25/16*

U.S. Cl. 439—207 **7 Claims**



1. An electric power busway switch comprising:

an electric switch enclosure having means for connecting between said switch enclosure and associated power equipment;

a plurality of connector clips depending from a bottom of said switch enclosure and arranged for plugging onto a corresponding plurality of vertically arranged busway tabs extending from a top of a power busway enclosure said busway tabs being attached to corresponding bus conductors horizontally arranged within said busway enclosure;

a neutral connector clip depending from said bottom and arranged for plugging onto a corresponding neutral tab extending from said top of said busway enclosure; and

a locating pin depending from said bottom and arranged for plugging into means arranged on said busway enclosure for positioning said connector clips relative to said busway tabs.

4,957,448

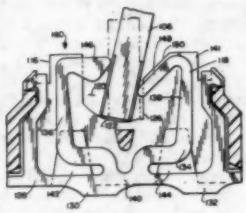
LOW INSERTION FORCE, LOW BOARD STRESS ELECTRICAL CONNECTOR

Kenneth W. Stanevich, New Baltimore, Mich., and Kent E. Regnier, Lombard, Ill., assignors to Molex Incorporated, Lisle, Ill.

Filed Oct. 17, 1989, Ser. No. 422,703

Int. Cl.[5] H01R *23/70*

U.S. Cl. 439—326 **10 Claims**



1. In a low-insertion-force electrical connector for connecting a daughter circuit board to a mother circuit board, the daughter circuit board having an edge, first and second opposed surfaces abutting the edge, and at least one contact on one of the two opposed surfaces, the electrical connector comprising in combination:

a. a housing having a plurality of adjacent insulating wafers spaced apart and joined by two opposing ramp means, each wafer having a wafer cavity, whereby adjacent wafers cooperatively provide a board cavity for penetration of the daughter board edge into the board cavity in the housing; and

b. at least one contact disposed in the space between a pair of adjacent wafers, the contact having a pair of opposing contact spring means disposed in the board cavity between adjacent wafers, and a pair of cantilevered latch arms, each latch arm having an inclined latch surface for mating contact with an inclined surface of the ramp means, the inclined surfaces of the latch arms and ramp means cooperatively providing means for positioning the contact in the housing.

4,957,449

CONNECTOR HOUSING UNIT HAVING THREADED FASTENER

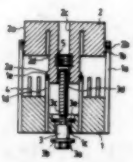
Yuji Hatagishi, Shizuoka, Japan, assignor to Yazaki Corporation, Tokyo, Japan

Filed Nov. 15, 1989, Ser. No. 436,986

Claims priority, application Japan, Nov. 18, 1988, 63-149744[U]

Int. Cl.[5] H01R *13/627*

U.S. Cl. 439—364 **5 Claims**



1. A connector housing unit for an electrical connector having a threaded fastener, said connector housing unit comprising:

a bolt disposed in a first connector housing;

a nut disposed in a second connector housing; and

a tentative fastening means having a first set of component parts and a tentative stoppage means having a second set of component parts provided on said first and second connector housings and positioned such that said first set of component parts of said tentative fastening means are engaged with each other at the same time as said second set of component parts of said tentative stoppage means are engaged with each other; wherein said bolt is axially movable within a prescribed range to be engaged with said nut as said first and second connector housings remain tentatively fastened to each other.

4,957,450

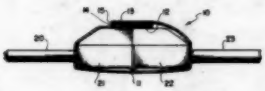
ELECTRICAL CORD PLUG & SOCKET RETAINER

Roger Pioszak, 34306 Joel, New Baltimore, Mich. 48047

Filed Sep. 18, 1989, Ser. No. 408,206

Int. Cl.[5] H01R *13/639*

U.S. Cl. 439—369 **1 Claim**



1. A retainer for releasably securing a combined plug and socket in connection in an unsupported position comprising:

an elongated flexible member having opposite ends separated by a midsection;

at least one slot provided in said elongated flexible member between said opposite ends and disposed midway between opposite edges defining the sides of said member;

said slot lying along the central longitudinal axis of said elongated member;

securement means cooperatively carried on said elongated flexible member for releasably joining said opposite ends together;

said flexible member is a strap and at least two slots are provided in spaced-apart relationship for receiving passage of the plug and socket respectively whereby said strap encircles the plug and socket connection to retain and restrain separation of the plug and socket; and

said securement means is a hook and pile fastener having a hook portion secured to one of said opposite ends and a pile portion carried on the other of said opposite ends.

4,957,451

MALE ELECTRICAL CONTACT

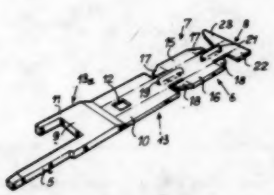
Léonard Nadin, L'Union, France, assignor to Labinal S.A., Mon Tigny le Bretonneux, France

Filed Jan. 9, 1990, Ser. No. 462,225

Claims priority, application France, Jan. 10, 1989, 89 00212

Int. Cl.[5] H01R *4/24*

U.S. Cl. 439—395 **10 Claims**



1. Male electrical contact comprising a substantially U-shape body incorporating two side members, a center member, a bar at one end and means at the opposite end for connecting said body to an electrical conductor, wherein said contact is manufactured by bending a blank formed from a material that is a good electrical conductor and that comprises two strips of different thickness and said bar and an adjoining part of said body are formed from the thicker of said strips.

4,957,452

ELECTRICAL TERMINAL

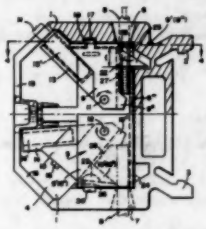
Roman Bolliger, Muttenz, Switzerland, assignor to Oskar Wortz & Inhaber Hans Woretz, Muttenz, Switzerland

Filed Nov. 9, 1989, Ser. No. 433,997

Claims priority, application Switzerland, Dec. 14, 1988, 4613/88

Int. Cl.[5] H01R *4/24*

U.S. Cl. 439—410 **9 Claims**



1. An electrical terminal including a casing of an insulating material having two openings, therein, and electrically conducting connector member for ends of two wires inserted through said two openings in said casing which connector member is located in said casing, including further electrically conducting contact members acting at the two end of said connector member and electrically connected thereto, which contact members are arranged to pivot over a movement arc operation thereof from the outside of said casing from a inoperative position into a clamping position in which they contact a respective inserted wire and retain it, said connector member comprising two side walls and a cross-piece interconnecting the two side walls such to provide a profile having a U-shaped passaged for receipt of the wire ends to be inserted therein; which two contact members are each pivotably mounted to said connector member between said side walls to pivot a around pivot axis and which contact members comprise two forked contact parts arranged each at an end located radially distant from one respective of said pivot axes and projecting approximately in about said movement arc, which forked contact parts enclose each a slot in alignment with said passage of the connector member, and include forked contact parts with mutually oppositely located edges of a knifelike design whereby upon a pivoting of a respective contact member into said clamping position the insulation of a wire end inserted into said connector member is cut through by said edges and a part of the cut insulation is pushed away.

4,957,453

ELECTRICAL SOCKET

Leonard J. Owen, Watford, England, assignor to AMP Incorporated, Harrisburg, Pa.

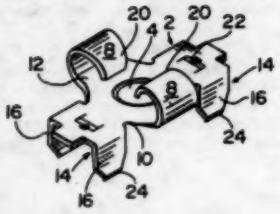
Filed Nov. 6, 1989, Ser. No. 432,296

Int. Cl.[5] H01R *4/24*

U.S. Cl. 439—422 **2 Claims**

1. An electrical socket for mounting on a flat, flexible conductor carrier (FFC), for the electrical connection of an electrical plug to a conductor of said conductor carrier (FFC), the socket comprising a base plate having a plug-receiving opening and a receptacle projecting from one face of the base plate, for a plug inserted through the plug-receiving opening substantially normally of the base plate, there projecting from the base plate upon each of two opposite sides of the opening, a pair of lugs which are deformable for engagement about said conductor (C); characterized in that the plug receptacle comprises a pair of contact springs, each being of substantially semicircular

shape, the contact springs presenting opposed, arcuate contact surfaces which are bowed towards each other and extend



across the plug-receiving opening to engage the plug (P) between them, the lugs projecting from the other face of the base plate.

4,957,454

PIN JACK

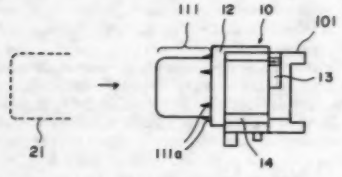
Akihito Shichida, Higashiosaka, Japan, assignor to Hosiden Electronic Co., Ltd., Yao, Japan

Filed Sep. 21, 1988, Ser. No. 247,193

Claims priority, application Japan, Sep. 29, 1987, 62-149125[U]

Int. Cl.[5] H01R *13/73*

U.S. Cl. 439—544 **2 Claims**



1. A pin jack which comprises a body having, at a longitudinal center, a bored hole to receive a pin plug, said body made of insulating material, said pin jack comprising:

a body base;

a cylindrical extension integrally connected to said body base and extending outward from a front of said body base;

a cylindrical cover made of conductive material which covers a first end of said cylindrical extension;

prongs mounted on the body base;

a jacket ring, having a concentric diameter larger than that of the cylindrical extension, said jacket ring covering a second end of said cylindrical extension which is toward the body base; and

a plurality of locking elements, projecting circumferencially from the body base, which fit over said cylindrical cover.

4,957,455

SOCKET FOR WEDGE-BASE LAMP

Kazuya Horiuchi, Mie; Kihachiro Uchida, Shizuoka; Tadashi Harada, Shizuoka, and Takeshi Izawa, Shizuoka, all of Japan, assignors to Sumitomo Wiring Systems, Limited, Mie and Koito Manufacturing Co., Ltd., Tokyo, both of, Japan

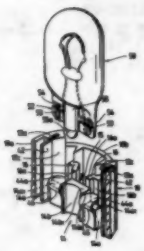
Filed Apr. 18, 1989, Ser. No. 340,613

Claims priority, application Japan, Apr. 19, 1988, 63-53321[U]; Dec. 16, 1988, 623-162366[U]

Int. Cl.[5] H01R *13/73*

U.S. Cl. 439—548 **9 Claims**

1. A socket for a wedge-base lamp, comprising: a generally cylindrical lamp socket body formed of an insulating material; first and second conductive terminal members positioned within said socket body for sandwiching a base portion of a lamp and making contact with terminals of said lamp, each of said terminal members comprising first and second contacting and sandwiching members opposed to each other; a pair of first vertical walls opposed to each other and defining a lamp insertion channel, one of said first vertical walls being positioned between said first contracting and sandwiching members and the other of said first vertical walls being positioned between said second contacting and sandwiching member; four second vertical walls, a first pair of said second vertical walls being disposed on opposite sides of one of said first vertical walls, a second pair of said second vertical walls being disposed on opposite sides of the other of said first vertical walls, each of said second vertical walls being located behind a respective



one of said contacting and sandwiching members, and a top end portion of each of said contacting and sandwiching members extending above and being bent over a top end of the respective one of said second vertical walls; and a plurality of third vertical walls, a respective one of said third vertical walls being located behind each juncture between one of said first vertical walls and a respective one of said second vertical walls, said third vertical walls extending above said top end portions of said contacting and sandwiching members by a height such that a base portion of a slantingly inserted lamp abuts against inside corner portions of said third vertical walls above said first vertical walls and is prevented from interfering with said top end portions of said contacting and sandwiching members.

4,957,456

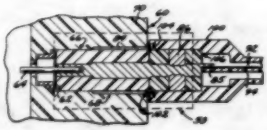
SELF-ALIGNING RF PUSH-ON CONNECTOR

Mark Olson, Torrance, and Clifton Quan, Arcadia, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Sep. 29, 1989, Ser. No. 415,004

Int. Cl.[5] H01R *13/54*

U.S. Cl. 439—578 **7 Claims**



1. A self-aligning push-on coaxial RF connector assembly, comprising:

a female connector structure comprising a feed through conductor element supported by and extending through a dielectric member, an outer conductive structure for defining a primary opening surrounding said dielectric member and conductor element and for defining a pilot opening having a diameter somewhat larger than the diameter

of said primary opening, the pilot opening communicating with the primary opening;

a male connector structure comprising a center conductor, a dielectric sleeve member having an axial opening formed therein for receiving the center conductor, the dielectric sleeve having an exterior dimension selected so that a portion of the sleeve can be inserted snugly into the primary opening of said female structure;

means for making electrical contact between the feed through conductor element of the female structure and the center conductor of the male structure when the sleeve and conductor are fully inserted into said primary opening; and

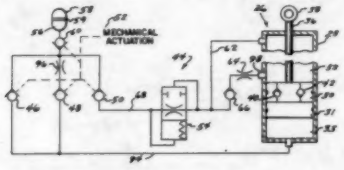
means for compensating the perturbation due to the oversizing of the pilot opening so that the transmission line provided by the connector assembly is characterized by a substantially constant characteristic impedance over the length of the assembly.

4,957,457

CONTROL SYSTEM FOR THE HYDRAULIC TILT FUNCTION OF A MARINE ENGINE

Harry C. Probst, Oshkosh, and James L. Bloemers, Fond du Lac, both of Wis., assignors to Brunswick Corporation, Skokie, Ill.

Filed Jul. 14, 1988, Ser. No. 219,053
Int. Cl.[5] B63H 5/12
U.S. Cl. 440—61 **4 Claims**



1. In a marine vessel having an outboard drive unit pivotally mounted thereto and a piston containing hydraulic cylinder operatively connected between the vessel and the drive unit so that pivotal movement of the drive unit results in the displacement of hydraulic fluid between a pair of fluid chambers in the cylinder, a system for controlling the movement of hydraulic fluid through the cylinder, said system comprising:

valve means in the cylinder restricting the flow of fluid between the fluid chambers,

bypass means allowing a less restricted flow of fluid between the fluid chambers,

a trim valve disposed in said bypass means allowing limited flow of fluid in a first direction of piston movement when said trim valve is in an open position,

tilt valve means disposed in said bypass means allowing unrestricted flow of fluid between the fluid chambers of the cylinder when said tilt valve means is in an open position,

velocity sensing valve means disposed in said bypass means for sensing high velocity fluid flow caused by rapid piston movement in a second direction and moving from a normally open position to a closed position in response to said high velocity fluid flow, and

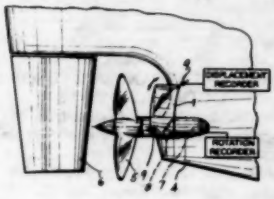
actuating means for selectively opening and closing said trim valve and said tilt valve means.

4,957,458

FLOW GUIDING FACE(S) FOR A SHIP

Cornelis Pronk, Drunen, Netherlands, assignor to Lips B. V., Drunen, Netherlands

Filed Feb. 28, 1989, Ser. No. 316,975
Claims priority, application Netherlands, Mar. 1, 1988, 8800526
Int. Cl.[5] B63H 5/06
U.S. Cl. 440—66 **7 Claims**



1. A ship comprising:

a hull having a rear end, a longitudinal axis and a screw propeller adjacent said rear end;

said screw propeller having a centerline;

a flow guide surface adjustably mounted to a portion of said hull in the vicinity of said rear end and in front of said propeller;

said flow guide surface together with said hull defining an area having a center which lies above the propeller centerline; and

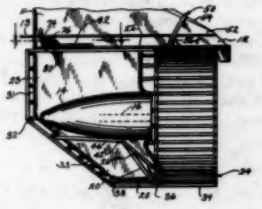
said flow guide surface being adjustable about more than one axis so that a spacial angle between the longitudinal axis of the hull and a centerline of the flow guide surface may be varied.

4,957,459

PROPELLER SHROUD WITH LOAD BEARING STRUCTURE

Richard H. Snyder, Oshkosh, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Aug. 23, 1989, Ser. No. 397,727
Int. Cl.[5] B63H 5/16
U.S. Cl. 440—72 **18 Claims**



1. In a marine drive having a driveshaft housing and a gearcase having a lower submerged torpedo-shaped portion having a propeller shaft carrying a propeller at the back end thereof, and having a skeg extending downwardly from said torpedo-shaped portion, a propeller shroud comprising a cage around said gearcase and said propeller and mounted to said gearcase and having a pair of inner spokes extending inwardly and bearing against the junction of said skeg and said torpedo-shaped portion such that impact force on said cage is transmitted to said junction, wherein said gearcase has a leading strut portion above said torpedo-shaped portion, and wherein:

said cage has a front portion with a leading edge extending

along the front of said strut-portion and said skeg, said front portion of said cage tapering rearwardly and outwardly;

said cage has a rear generally cylindrical portion around said propeller and extending rearwardly from said front portion;

said cage has a generally circular rib at the intersection of said front and rear portions;

said spokes extend generally radially inwardly from said circular rib to said junction of said skeg and said torpedo-shaped portion.

4,957,460

THRUST BEARING ARRANGEMENT FOR MARINE OUTBOARD DRIVES

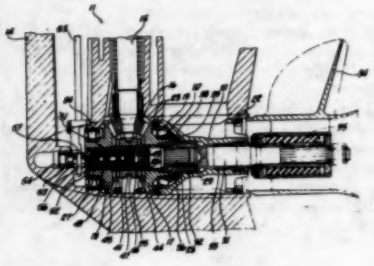
Norimichi Harada, and Akihiro Onoue, both of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan

Filed Jan. 16, 1986, Ser. No. 819,759

Claims priority, application Japan, Jan. 31, 1985, 60-15415

Int. Cl.[5] B63H *5/13*

U.S. Cl. 440—83 **12 Claims**



1. In a thrust bearing arrangement for the propeller shaft of a marine outboard drive comprising a lower unit outer housing, a drive shaft supported for rotation within said lower unit housing, a propeller shaft and transmission means for selectively driving said propeller shaft in a forward and reverse direction from said drive shaft, the improvement comprising a first thrust bearing for taking driving thrusts in one direction from said propeller shaft, a second thrust bearing for taking the driving thrusts in the opposite direction from said propeller shaft, and means for transmitting the thrusts from said first and second thrust bearings to said lower unit housing without the thrusts from one of said bearings passing to said outer housing through an element which transfers the thrust from the other of said bearings to said outer housing.

4,957,461

IDLING NOISE SILENCER FOR MARINE PROPULSION UNIT

Manabu Nakayama, Hamamatsu, Japan, assignor to Sanshin Kogyo Kabushiki Kaisha, Hamamatsuo, Japan

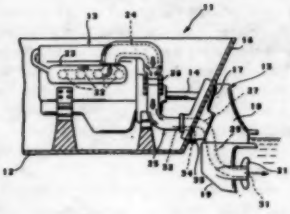
Filed Dec. 2, 1988, Ser. No. 278,973

Claims priority, application Japan, Dec. 2, 1987, 62-304771

Int. Cl.[5] B63H *21/32*

U.S. Cl. 440—89 **8 Claims**

1. A marine outboard drive comprised of a lower unit formed with an outer casing, an exhaust passage formed within said outer casing and terminating in an outlet opening disposed slightly below the level of water in which the associated watercraft is operating other than at high speeds and above the water at high speeds, and a baffle plate fixed against movement relative to said outer casing and extending across said outlet opening for restricting the effective size thereof and redirecting the flow of exhaust gases emanating from said outlet opening for



breaking up the size of exhaust gas bubbles emanating from said outlet opening for improving gas silencing at low speeds.

4,957,462

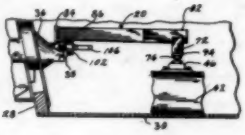
ENGINE MOUNT INSTALLATION TOOL AND METHOD

James E. Erickson, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed May 18, 1989, Ser. No. 353,875

Int. Cl.[5] B63H *5/12*

U.S. Cl. 440—111 **18 Claims**



1. In a marine stern drive having an inboard engine, an outdrive with a gimbal bearing at the transom of a boat, and a drive coupler shaft extending through said gimbal bearing and between said outdrive and said engine, said outdrive being mounted to said transom by an inner transom plate having a pair of engine supports thereon for supporting the rear of said engine, said boat having a pair of longitudinal stringers with a pair of engine mounts thereon for supporting the front of said engine, said engine having a pair of rear mounts mounted on said rear engine supports on said inner transom plate, said engine having a pair of front supports mounted on said front engine mounts on said stringers, said front engine mounts being vertically adjustable to vary the height of the front of said engine to align said engine with said gimbal bearing, an engine mount installation tool for locating said front engine mounts horizontally on said stringers prior to installation of said engine to horizontally pre-align said front engine mounts with said front engine supports said tool including vertical alignment structure vertically locating the proper height of said front engine mounts prior to installation of said engine to pre-set the height adjustment of the front of said engine to assure proper alignment of said engine with said gimbal bearing after installation of said engine.

4,957,463

METHOD OF MAKING A LONG LIFE HIGH CURRENT DENSITY CATHODE FROM TUNGSTEN AND IRIDIUM POWDERS USING A QUATERNARY COMPOUND AS THE IMPREGNANT

Louis E. Branovich, Howell; Bernard Smith, Ocean; Gerard L. Freeman, Freehold, and Donald W. Eckart, Wall, all of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 2, 1990, Ser. No. 459,629
Int. Cl.[5] H01J 9/04
U.S. Cl. 445—50 8 Claims

1. Method of making a long life high current density cathode suitable for operation in microwave devices from tungsten and iridium powders using a quaternary compound including barium, oxygen, a metal selected from the group consisting of osmium, iridium, rhodium, and rhenium, and a metal selected from the group consisting of strontium, calcium, scandium, and titanium as the impregnant, said method including the steps of:

(A) mixing the tungsten and iridium powders in a weight ratio of about 60 weight percent tungsten to about 39 weight percent iridium,

(B) adding about 1 percent by weight of zirconium hydride to the mixture,

(C) ball milling the mixture for about 8 hours,

(D) pressing the ball milled mixture into a billet at about 48,000 psi in a die,

(E) sintering the billet at about 1800° C. for about ½ hour in dry hydrogen of less than −100 dewpoint,

(F) backfilling the billet with copper in dry hydrogen at about 1150° C.,

(G) machining the billet to the desired geometry,

(H) removing the copper by etching in nitric acid,

(I) thoroughly rinsing in deionized water, methanol and then drying,

(J) firing the billet in dry hydrogen to about 1400° C. for about 15 minutes,

(K) impregnating the billet with a quaternary compound including barium, oxygen, a metal selected from the group consisting of osmium, iridium, rhodium and rhenium, and a metal selected from the group consisting of strontium, calcium, scandium, and titanium as the impregnant by firing the billet in a dry hydrogen furnace at a temperature at which the impregnant melts,

(L) removing the billet from the furnace after the furnace is cooled, and

(M) removing any loose pieces of impregnant from the billet.

4,957,464

DOLL WITH MEANS FOR PRODUCING SOAP BUBBLES

Jose L. J. Perez, Biar Alicante, Spain, assignor to Jesmar S. A., Otra. de Alcoy, Spain

Continuation of Ser. No. 63,423, Jun. 17, 1987, Pat. No. 4,840,597. This application Mar. 31, 1989, Ser. No. 331,190
The portion of the term of this patent subsequent to Jun. 20, 2006, has been disclaimed.
Int. Cl.[5] A63H 33/00
U.S. Cl. 446—16 16 Claims

1. A bubble producing doll, comprising:

(a) a doll body simulating a human figure with a trunk portion, a head connected to the trunk portion and having a mouth opening, a pair of arms having hand extremities with one arm pivotally mounted to the upper end of the trunk portion for up and down movement in relationship to the upper end of the trunk portion and a pair of legs connected to the lower end to the trunk portion;

(b) a receptacle connected to the front section of the trunk portion for storing bubble making liquid;

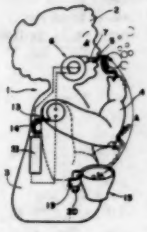
(c) air producing means connected to the mouth opening formed in said head through which air is impelled;

(d) a battery-operated electrical circuit located inside the trunk portion for activating the air producing means;

(e) switching means connected to the electrical circuit for closing and opening the circuit and having a switching element located on the pivotally mounted arm; and

(f) a bubble-making liquid, pick-up took, separate from the hand extremities of the arms, and having a first handle portion connected at one end to the hand extremity of the pivotally mounted arm and a second ring-like portion extending from the other end of the tool handle portion for holding a film of the bubble making liquid;

wherein the mouth opening in said head and the receptacle on the front section of the trunk portion are arranged along a circumferential arc centered at a point where said



arm is pivotally mounted on the trunk, the arc having a radius equal to the distance between said point and the second portion of said tool, and

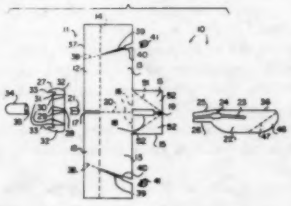
wherein after the tool is placed in the receptacle and a film of liquid is formed thereon and when the pivotally mounted arm having the tool is raised to a position near the mouth opening of the doll head through the arc, the switching element on the arm closes the electrical circuit activating the air producing means to produce and simulate a human figure blowing bubbles produced from the film on the tool.

4,957,465

MODEL AIRPLANE OR TOY GLIDER

Madhava dasa, P.O. Box 461, Kula, Hi. 96790-0461

Filed Apr. 8, 1988, Ser. No. 179,231
Int. Cl.[5] A63H 27/18
U.S. Cl. 446—61 4 Claims



1. A toy glider comprising:

a wing having leading and trailing edges and formed of a semi-rigid, scoreable and foldable material, said wing having a first score line on the longitudinal centerline thereof and a second score line extending transversely across the length of said wing at approximately one third the distance from said leading edge, said second score line dividing said wing into leading edge and trailing edge panels, said leading edge panel having a slot extending inwardly from the leading edge thereof on the longitudinal centerline of said wing to said second score line;

an angle setting member insertable into the slot of said leading edge panel for engaging the portions of said leading

panel on opposite sides of the slot to establish the dihedral angle thereof; and

a fuselage formed of a semi-rigid, scoreable and foldable material, said fuselage having a body portion with a leading edge and a trailing edge, said body portion having a slot extending rearwardly from the leading edge thereof, the slot having an entry portion, a central portion and an inner portion, the width of the inner portion being substantially equal to the thickness of said material forming said wing, the central portion being of sufficiently greater width as to accommodate said angle setting member, said entry and central portions being angled relative to the inner portion whereby, in the assembled configuration of said glider, said leading edge panel of said wing is angled downwardly relative to said trailing edge panel.

4,957,466

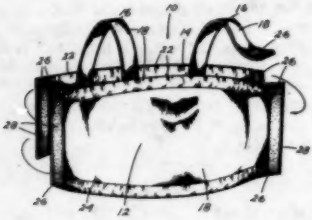
ATHLETIC SUPPORTER FOR WOMEN

Trisha L. Hopps, 585 Roberts Rd., Paradise, Calif. 95969

Filed Oct. 23, 1989, Ser. No. 425,684

Int. Cl.[5] A41C *3/00*

U.S. Cl. 450—85 **5 Claims**



1. An athletic supporter for women adapted by pattern to be worn as an upper body covering and by structure to prevent excessive breast movement during active participation in sports, said supporter comprising in combination:

a front panel;

said front panel adapted to supportively cover and contour to a female breast shape by resilience in a thickened elastic filling sandwiched between encasing walls of a stretchable covering material;

said covering material having permeative qualities for transferring sweat and heat away from a wearer's body;

a back panel;

said back panel adapted to contour to the back shape of a human wearer by elasticity in materials forming a double wall thereof;

said double wall of said back panel having permeative qualities for transferring sweat and heat away from a wearer's body;

means for attaching said front panel to said back panel adjustably sized relative to said wearer's requirements;

means for maintaining said supporter adjustably in a breast supporting and covering positioned relative to said wearer's shoulders with said front panel providing said breast supporting and covering and said back panel fitted to the back of said wearer;

means providing for tighter containment of an upper portion and of a lower portion of both said panels relative to breast size and body measurements of said wearer.

4,957,467

DEVICE FOR PRIMARY SEPARATION OF GRAIN IN A COMBINE HARVESTER FOR CEREALS

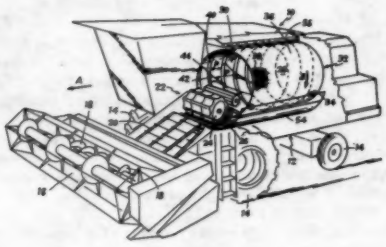
Alain Zachary, Vonce, 08400 Vouziers, France

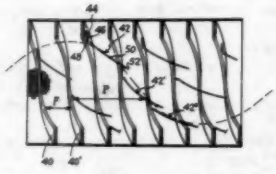
Filed Sep. 28, 1989, Ser. No. 413,582

Claims priority, application France, Oct. 14, 1988, 88 13588

Int. Cl.[5] A01F *12/20*

U.S. Cl. 460—69 **8 Claims**





1. In a combine harvester-thresher for cereals, which comprises a chassis and ground engaging wheels, the combine having a front end and a rear end, relative to its direction of travel, and further comprising, from its front end to its rear end:

a mower for cutting cereal crop stalks over a wide width and bringing them together into a narrower bed by means of oppositely-handed screw conveyors,

a mown crop conveyor which raises the cereal bed from the mower,

a thresher for receiving crop from the conveyor, said thresher comprising a fixed backing member and a threshing rotor which is rotated by a motor and transmission unit, and

a rotary grain separator comprising a cylindrical drum having an axis extending substantially horizontally and longitudinally with respect to the chassis and rotatably mounted about said axis, the drum having an inlet orifice facing said thresher and an outlet orifice opening at the rear end of the combine, the drum comprising a cylindrical wall provided with a plurality of perforations adapted for the passage of grain therethrough, and at least one internally protruding rib fixed to the cylindrical wall and forming a helix at a first predetermined pitch extending over the entire length of the drum, the improvement wherein

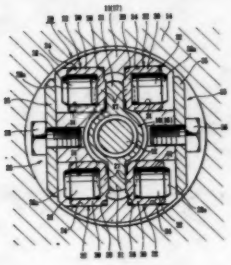
said drum further comprises a plurality of inwardly projecting elongate drive members fixed thereto and arranged, both longitudinally and circumferentially relative to the drum, in such a manner as to form sets of successive portions of respective helixes having a second pitch which is several times greater than the first pitch.

4,957,468

HYDRAULIC REACTION FORCE APPARATUS OF POWER STEERING DEVICE

Shigeru Otsuka, and Hiroshi Ohsaki, both of Higashimatsuyama, Japan, assignors to Jidosha Kiki Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 62,008, Jun. 12, 1987, abandoned. This application Oct. 12, 1988, Ser. No. 256,884
Claims priority, application Japan, Jun. 19, 1986, 61-141291
Int. Cl.[5] F16D *3/80*; B62D *5/06*
U.S. Cl. 464—27 9 Claims



1. A hydraulic reaction force apparatus of a power steering device, comprising:

an input shaft;

an output shaft;

means for providing direct torsional coupling between said input shaft and said output shaft; and

means for providing a variable drag force in opposition to said direct torsional coupling means, said drag force means including:

reaction force arms, connected integrally with said input shaft, and projecting radially therefrom;

a pair of output shaft guide holes, sandwiching each of said reaction force arms, and oppositely disposed to each other in a direction perpendicular to said reaction force arms;

a plurality of reaction force plungers each slidably disposed in a corresponding different one of said guide holes; and

means for providing a hydraulic force for biasing said reaction force plungers against said reaction force arms to oppose relative rotation between said output shaft and said input shaft;

each of said reaction force plungers comprising

a metal cylindrical member having a hollow portion open at a side opposite to that of said reaction force arms; and

a damping member carried by said cylindrical member, said damping member having an inner end, an outer end and means for exposing said inner end and said outer end to said hydraulic force.

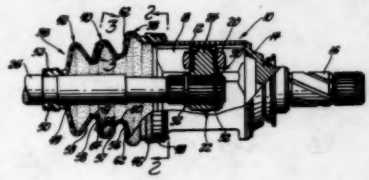
4,957,469

CONVOLUTED BOOT SEAL WITH ANTI-ABRASION SIDE WALL RIBS

Donovan J. Zollinger, Saginaw, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 7, 1989, Ser. No. 447,331
Int. Cl.[5] F16D *3/84*
U.S. Cl. 464—175 4 Claims

3. A boot seal for enclosing and sealing a device operatively mounted within a housing, said boot seal defined by a generally annular body having spaced first and second attachment portions, said body being made of thin wall resilient material to have a series of convolutions extending between said first and second attachment portions, said convolutions having side walls facing one another, at least some of said side walls having a series of resilient thin wall ribs integrally formed on the radial side wall of at least one convolution which projects toward the adjoining side walls of an adjacent convolution, said ribs terminate in contact faces normally spaced from said adjoining side wall and movable into physical contact therewith during varying flexure actions of said boot seal so that said ribs can bend to eliminate direct sliding contact between said adjacent side walls and the physical wear thereof.

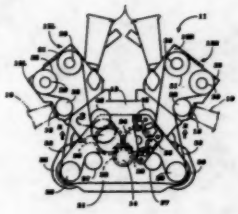


4,957,470

VALVE OPERATING SYSTEM FOR ENGINE

Masaaki Yoshikawa, Iwata, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Aug. 7, 1989, Ser. No. 390,606
Claims priority, application Japan, Aug. 8, 1988, 63-197739
Int. Cl.[5] F16H *7/08*
U.S. Cl. 474—101 7 Claims



1. In a flexible transmitter drive for the camshaft of an internal combustion engine comprising a sprocket, a flexible transmitter engaged with said sprocket, said flexible transmitter and said sprocket having interengaging members for transmitting a positive drive therebetween, the improvement comprising a timing retaining member juxtaposed to said sprocket on the backside of said flexible transmitter and engaged therewith in a position to prevent the interengaging members of said sprocket and said flexible transmitter from moving out of engagement.

4,957,471

ADJUSTABLE LOCKED CENTER AND DYNAMIC TENSIONER

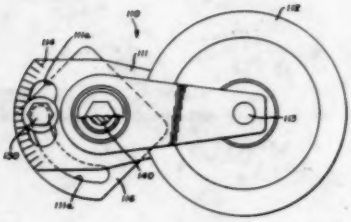
Richard C. St. John, 731 Bechtel St., SE., North Canton, Ohio 44720

Filed Jul. 24, 1989, Ser. No. 383,630
Int. Cl.[5] F16H *7/08*
U.S. Cl. 474—133 28 Claims

1. A method of setting tension in a belt or chain drive system using a pivoting belt tensioner, comprising the steps of:

(a) forcing the tensioner against a stable mounting surface with a clamping load of such a magnitude that a target friction torque will be required to rotate the tensioner; and

(b) rotating the tensioner arm against the belt or chain until, when the setting torque is removed, the belt counter-



rotates the tensioner arm and the target friction torque causes the target tension to remain in the belt.

4,957,472

TRACK FOR SNOW VEHICLE

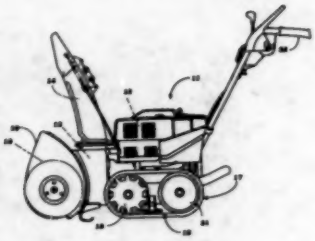
Tomio Nakano, Iwata, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Aug. 1, 1989, Ser. No. 387,934

Claims priority, application Japan, Aug. 2, 1988, 63-192091

Int. Cl.[5] F16H *7/02*

U.S. Cl. 474—203 **19 Claims**



1. A drive belt for a snow vehicle or the like comprising a surface adapted to engage the snow surface and providing driving engagement therewith, a plurality of drive teeth formed on said surface and projecting therefrom for improving the traction, certain of said teeth being configured differently other of said teeth for improving traction on different types of surfaces.

4,957,473

ROTATIONAL SPEED DIFFERENTIAL RESPONSIVE TYPE TORQUE TRANSMITTING ASSEMBLY

Tooji Takemura, Yokohama, and Takashi Okubo, Zama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Nov. 7, 1988, Ser. No. 267,602

Claims priority, application Japan, Nov. 6, 1987, 62-16994[U]; Dec. 3, 1987, 62-184485[U]

Int. Cl.[5] F16H *1/44*

U.S. Cl. 475—231 **11 Claims**

1. A rotational speed differential responsive type torque transmitting assembly, comprising:

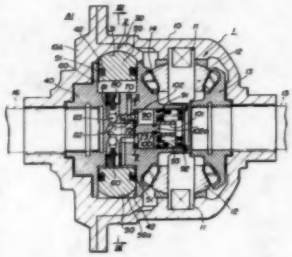
a first rotary element rotatable about an axis, said first rotary element including internal cam surface meansf

a second rotary element disposed in said first rotary element, said second rotary element including a rotor containing a plurality of radially outwardly opening cylinders facing said internal cam surface means;

hydraulic means for transmitting a portion of torque from one of said first and second rotary elements to the other in response to a rotational speed differential between said first and seconde rotary elments,

said hydraulic means including pistons in said cylinders in engagement with said internal cam surface means and reciprocating in response to said rotational speed differential to define variable volume pressure chambers in said cylinders, respectively,

said hydraulic means including an accumulator with an accumulator chamber, and hydraulic fluid passage means in fluid communication with said pressure chambers and also with said accumulator chamber, said hydraulic fluid passage means allowing discharge of hydraulic fluid from



each of said pressure chambers on the discharge stroke of the associated one of said pistons to said accumulator chamber, said hydraulic fluid passage means allowing supplying of hydraulic fluid from said accumulator chamber to each of said pressure chambers on the suction stroke of the associated one of said pistons,

said hydraulic means including orifice means for restricting discharge of hydraulic fluid from each of the pressure chambers on the discharge stroke of the associated one of said pistons,

said hydraulic means allso including valve means for discharging a portion of hydraulic fluid from said accumulator chamber.

4,957,474

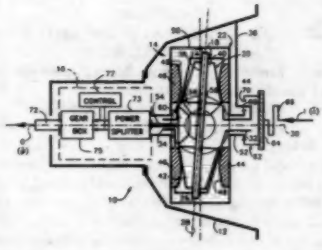
TRACTION DRIVE TRANSMISSION SYSTEM

Yves J. Kemper, Bloomfield Hills, Mich., assignor to Tractiontec Corporation, Bloomfield Hills, Mich.

Continuation-in-part of Ser. No. 435,658, Nov. 13, 1989, abandoned, which is a continuation-in-part of Ser. No. 270,639, Nov. 14, 1988, abandoned. This application Mar. 22, 1990, Ser. No. 497,528

Int. Cl.[5] F16H *15/56, 37/06*

U.S. Cl. 475—279 **15 Claims**



1. In a multi-range power transmission system including a rotatable system input shaft and a rotatable system output

shaft, a continuously variable transmission unit (CVT) having CVT input and CVT output shafts, the output speed of said CVT being adjustable between system input speed and a shifting speed, a four shaft compound planetary gear power splitter having a first shaft driven by said system input shaft, a second shaft driven by said CVT output shaft, a third shaft and a fourth shaft, and a multi-range output gearbox for driving said system output shaft, the improvement comprising:

means for defining said gearbox comprising a planetary gear set having a carrier shaft eccentric with respect to and connected directly to said system output shaft, an input sun gear, a ring gear and means for grounding said ring gear, said planetary gear set having a basic ratio equal to the speed of said third shaft divided by the speed of said fourth shaft when said CVT is at said shifting speed; and

control means for alternately coupling said third and fourth shafts of said splitter with said gearbox to provide at least three synchronous ranges of system speed ratios, each of such ranges of system speed ratios being continuously variable by operation of said CVT between 1:1 and said shifting ratio.

4,957,475

SOLID-BOWL HELICAL CENTRIFUGE

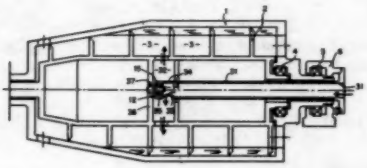
Walter Kreill, Vilsbiburg, Fed. Rep. of Germany, assignor to Flottweg GmbH, Vilsbiburg, Fed. Rep. of Germany

Filed May 4, 1989, Ser. No. 347,758

Claims priority, application Fed. Rep. of Germany, May 11, 1988, 3816210

Int. Cl.[5] B04B *1/20*

U.S. Cl. 494—53 **13 Claims**



1. A solid-bowl helical centrifuge, particularly a counterflow centrifuge, for separating a suspension; comprising: a bowl and a feed screw, a separation space being left between said screw and said bowl; a stationarily secured intake pipe for supplying the suspension from a stationary infeed point outside the centrifuge to said separation space; said intake pipe extending into an intake space inside said screw; said intake pipe having an end in said intake space and resting against a component secured to said screw; a friction bearing with two halves made of ceramic material where said two halves contact each other, said component being secured to said screw by said friction bearing.

4,957,476

AFTERLOADING RADIOACTIVE SPIRAL IMPLANTER

Elmer R. Cano, Pittsburgh, Pa., assignor to University of Pittsburgh, Pittsburgh, Pa.

Filed Jan. 9, 1989, Ser. No. 295,243

Int. Cl.[5] A61M *36/12*

U.S. Cl. 600—7 **12 Claims**

1. An apparatus for implanting a sealed radioactive source into a patient comprising:

a hollow member substantially spiral in shape having a sealed end, and an opening through which the radioactive source is introduced into the member, said member having

a shape that defines an axis such that the member is disposed about the axis.

4,957,477

HEART ASSIST JACKET AND METHOD OF USING IT

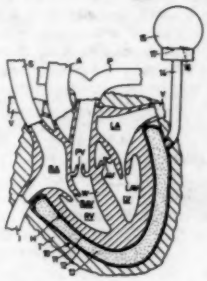
Stig S. Lundbäck, Vaxholm, Sweden, assignor to Astra Tech AB, Stockholm, Sweden

Continuation of Ser. No. 55,302, May 22, 1987, abandoned. This application May 9, 1989, Ser. No. 349,871

Claims priority, application Sweden, May 22, 1986, 8602335

Int. Cl.[5] A61B *17/00*

U.S. Cl. 600—16 **8 Claims**



1. A passive heart assist device for insertion into the thoracic cavity of a patient between the thoracic wall and the heart comprising:

a jacket having relatively moveable, connected inner and outer walls, wherein said inner wall is formed of pliable material and is adapted to fit snugly around at least the ventricular portion of the heart over the left and right ventricles; wherein said walls define a fluid-containing innerspace including a left ventricle portion and a right ventricle portion; wherein said portions are in fluid communication with one another; and means for maintaining a volume of fluid in said innerspace at all times, wherein said fluid is displaceable from one portion to the other in response to movement of one of the ventricles toward said outer wall thereby to enable the stroke volumes of the ventricles to vary as the heart beats.

4,957,478

PARTIALLY IMPLANTABLE HEARING AID DEVICE

Anthony J. Maniglia, 14450 County Line Rd., Hunting Valley, Ohio 44022

Filed Oct. 17, 1988, Ser. No. 258,788

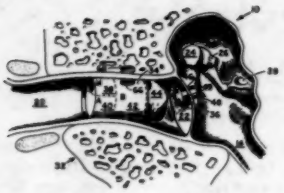
Int. Cl.[5] H04R *25/00*

U.S. Cl. 600—25 **9 Claims**

1. A totally concealed, partially implantable hearing device for an ear having an ossicular chain including a malleous located internally of a tympanic membrane comprising:

a replaceable outer ear canal unit, having means for generating a first magnetic field responsive to acoustic energy received by the unit, and adapted to be located inside the outer ear canal of an ear;

a magnet, having a second magnetic field, located adjacent to said unit at a distance sufficient to permit the first and second magnetic fields to interact with each other and causing the magnet to vibrate in a manner responsive to the acoustic energy received by the unit; and



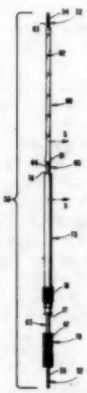
means for securely attaching the magnet to an ossicular chain in the ear by mounting the magnet through an abutment with both located externally of the tympanic membrane and being connected to the malleous by connecting means extending through the tympanic membrane, wherein said connecting means includes two man-made minicavities in said malleous and said tympanic membrane, and a pair of self-tapping titanium mini-screws, each of said mini-screws inserted through a hole in the magnet and adapted to be closely received and biointegrated into said two man-made minicavities.

4,957,479

INDWELLING URETERAL STENT PLACEMENT APPARATUS

Frederick D. Roemer, Bloomington, Ind., assignor to Vance Products Incorporated, Spencer, Ind.

Filed Oct. 17, 1988, Ser. No. 258,832
Int. Cl.[5] A61M *25/00*
U.S. Cl. 604—8 **8 Claims**



5. A method of implanting an indwelling ureteral stent in a patient, comprising the steps of:

assembling a placement apparatus by serially disposing a tubular stent, a tubular pusher and a releasable clamp in end-to-end abutting relationship about a wire guide with the proximal end of the tubular stent adjacent the anatomically proximal end of the wire guide, wherein the stent is hollow along its entire length and includes retentive portions at each of the distal and proximal ends of the stent adapted to resiliently assume a curved shape when the wire guide is removed from the stent;

inserting the proximal end of the placement apparatus into the ureter through one of the bladder or the kidney of the patient with the clamp engaged on the wire guide;

advancing the placement apparatus along the ureter until the proximal end of the wire guide is situated within the other of the bladder or the kidney;

advancing the pusher along the wire guide, while maintaining the position of the clamp and the wire guide relative to the patient, to force the stent along the wire guide through the ureter until the retentive portion at the proximal ends of the stent is situated within the other of the bladder or the kidney and has resiliently assumed its curved shape;

retracting the wire guide form the ureter through the pusher and the stent, while maintaining the position of the pusher relative to the patient, until the flexible end of the wire guide has retracted beyond the retentive portion at the distal end of the stent and the retentive portion has resiliently assumed its curved shape within one of the bladder or the kidney to retain the stent within the ureter;

completely retracting the clamp, wire guide and pusher with the stent fully indwelling, wherein

said wire guide includes a relatively flexible tip portion of predetermined length from the proximal end of the wire guide; and

said step of serially disposing includes adjustably positioning a segment of the retentive portion at the proximal end of the stent about a portion of the predetermined length of the flexible tip so that the retentive portion begins to assume its curved shape.

4,957,480

METHOD OF FACIAL TONING

Gerhard H. Morenings, Bristol, Va., assignor to Universal Health Products, Inc., Bristol, Va.

Filed Feb. 2, 1988, Ser. No. 151,566
Int. Cl.[5] A61N *1/30*
U.S. Cl. 604—20 **25 Claims**

1. The method of toning the muscles and tissues of the human face by stimulating the motor nerves to cause contraction of the muscles of the human face by used of a pair of electrodes connected to a source of predetermined galvanic current and operating at a predetermined frequency and predetermined polarity, said method comprising:

continually moistening the tips of said electrodes with a liquid solution of positively and negatively charged particles and pressing said moistened tips against the skin of said human face at two different positions and while pressed against said skin moving in a predetermined manner at least one of said moistened tips relative to the other to a still different position as the charged particles penetrate into the epidermis and dermis of said face whereby the movement in said predetermined manner results in

improved penetration of the charged particles into the epidermis and dermis of said face to further tone the muscles and tissues of the human face.

4,957,481

PHOTODYNAMIC THERAPEUTIC TECHNIQUE

Robert A. Gutenby, Wynnewood, Pa., assignor to U.S. Bioscience, Blue Bell, Pa.

Continuation of Ser. No. 103,319, Oct. 1, 1987, abandoned. This application Jul. 3, 1989, Ser. No. 374,823

Int. Cl.[5] A61N *1/30*

U.S. Cl. 604—20 **27 Claims**

1. A method of reducing the severity of symptoms resulting from the presence of a tumor in a subject comprising:

(1) injection of an effective amount of a photosensitive compound directly into said tumor in at least one location in said tumor;

(2) insertion of at least one sheathed light source, completely sheathed in a clear sheath catheter, into said tumor, said light source being capable of emitting light at a wavelength which is absorbed by said photosensitive compound; and

(3) activation of said light source

whereby said light is absorbed by said photosensitive compound, thereby disrupting the tumor cells and reducing the severity of tumor-induced symptoms.

4,957,482

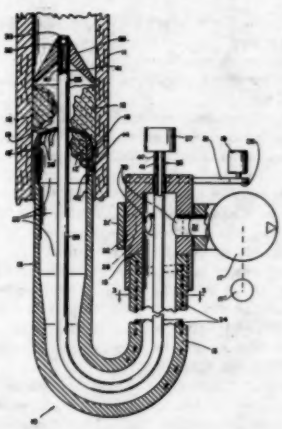
ATHERECTOMY DEVICE WITH A POSITIVE PUMP MEANS

Samuel Shiber, Woburn, Mass., assignor to Surgical Systems & Instruments, Inc., Mundelein, Ill.

Continuation-in-part of Ser. No. 286,509, Dec. 19, 1988, Pat. No. 4,894,051, which is a continuation-in-part of Ser. No. 243,900, Sep. 13, 1988, Pat. No. 4,886,490, which is a continuation-in-part of Ser. No. 78,042, Jul. 27, 1987, Pat. No. 4,819,634, and a continuation-in-part of Ser. No. 205,479, Jun. 13, 1988, Pat. No. 4,883,458, and a continuation-in-part of Ser. No. 225,880, Jul. 29, 1988, Pat. No. 4,842,579, which is a continuation-in-part of Ser. No. 18,083, Feb. 24, 1987, which is a continuation-in-part of Ser. No. 874,546, Jun. 16, 1986, Pat. No. 4,732,154, which is a continuation-in-part of Ser. No. 609,846, May 14, 1984, abandoned. This application Mar. 22, 1989, Ser. No. 326,967 The portion of the term of this patent subsequent to Jun. 27, 2006, has been disclaimed.

Int. Cl.[5] A61B *17/00*

U.S. Cl. 604—22 **8 Claims**



1. An atherectomy system for cutting, ingesting and removing an obstruction from within a patient's artery, comprising in combination:

a flexible guide-wire insertable into said artery,

a flexible rotary-catheter being rotatably disposed and slidable over said flexible guide-wire,

a blade forming a distal end of said flexible rotary-catheter having at least one tooth on its periphery which is bent inward,

a continuous passage surrounding said flexible guide-wire for ingesting the cut obstruction material, said continuous passage being defined between said flexible rotary-catheter and said flexible guide-wire,

coupling means at said proximal end of said flexible rotary-catheter for coupling it to a rotating means, and

suction means connected to said continuous passage to pull said cut obstruction material proximally.

4,957,483

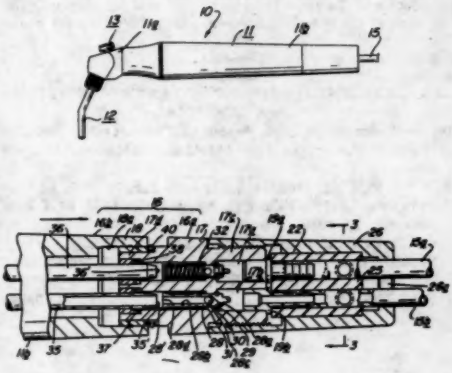
STERILIZABLE SYRINGE

Donald I. Gonser, and Douglas M. Reinhart, both of Lancaster, Pa., assignors to Den-Tal-Ez, Inc., Audubon, Pa.

Filed Oct. 21, 1988, Ser. No. 260,932

Int. Cl.[5] A61C *1/08*

U.S. Cl. 604—30 **18 Claims**



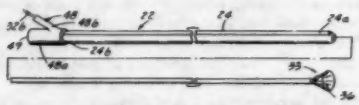
1. In a syringe having a handle with a nozzle at its proximal end portion, a normally-closed flow control valve located in said handle for controlling flow through the nozzle, a distal end portion, and means providing a fluid flow conduit extending in said handle between said valve and said distal end, the improvement comprising: coupling means for releasably coupling the distal end portion of said handle to an end portion of a flexible hose connected to a source of fluid flowable through said flow conduit means in said handle with respect to said nozzle, said coupling means including a first coupling component mountable on said hose end portion and a second coupling component carried by said distal end portion of said handle, said first and second coupling components being telescopically matingly engageable and disengageable with one another and having cooperating valving and actuator means operable automatically upon engagement to provide fluid communication between said hose and said handle when said coupling components are interconnected and upon axial disengagement to block said fluid communication, said actuator being carried by said syringe, whereby upon disconnection any fluid remaining in the conduct can be drained by opening the flow control valve to permit drainage.

4,957,484

LYMPH ACCESS CATHETERS AND METHODS OF ADMINISTRATION

Robert Murtfeldt, LaCanada, Calif., assignor to Automedix Sciences, Inc., Torrance, Calif.

Filed Jul. 26, 1988, Ser. No. 224,395
Int. Cl.[5] A61M *25/01, 25/10*
U.S. Cl. 604—53 **20 Claims**



1. A device for accessing a selected one of the thoracic duct and the right lymphatic duct to withdraw lymph fluid therefrom, comprising:

(a) an elongated tubular member having first and second ends said tubular member having a lymph fluid drainage port located proximate said second end;

(b) guide means slidably receivable within said tubular member for controllably orienting said first end thereof; and

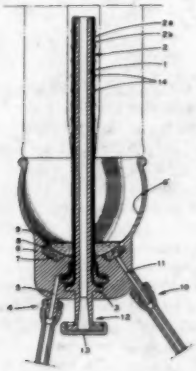
(c) lymph fluid collection and flow directing means slidably receivable within and disposed proximate said first end of said tubular member for collecting lymph fluid from a location proximate the termination of one of the thoracic duct and the right lymphatic duct and for directing the flow of the lymph fluid toward said fluid drainage port.

4,957,485

ARRANGEMENT FOR THE INSTILLATION OF FLUIDS IN A URETHRA

Ingvar Andersson, PL 80, S-450 34 Fiskebackskil, and Jan Wadstein, Karlavägen 67, S-111 45 Stockholm, both of Sweden

PCT No. PCT/SE87/00361, § 371 Date Feb. 7, 1989, § 102(e) Date Feb. 7, 1989, PCT Pub. No. WO88/01183, PCT Pub. Date Feb. 25, 1988
PCT Filed Aug. 18, 1987, Ser. No. 313,185
Claims priority, application Sweden, Aug. 20, 1986, 8603511
Int. Cl.[5] A61M *29/00*
U.S. Cl. 604—96 **4 Claims**



1. An arrangement for the instillation of fluid in a urethra comprising:

a tube connected to a source of fluid for instillation into the urethra, said tube having sufficient rigidity and diameter for insertion into the urethra, said tube having two ends, one end of said tube being adapted for insertion into the urethra, the other end of said tube being adapted to remain outside of said urethra and having a flange positioned thereon, said tube having a length of about one decimeter;

an inflatable sac engaging the outer surface of said tube and extending from said one end of the tube substantially the length of said tube toward said other tube end, said sac having elastic walls and having respective inflated and uninflated conditions, said sac having a generally cylindrical configuration when in its uninflated condition and having a generally conical configuration when in its inflated condition, said generally conical configuration comprising a base situated at said one end of the tube and a tip situated generally at said flange at said other end of the tube;

an adaptation piece positioned at said other end of the tube and having said flange anchored therein, said adaptation piece having a form adapted to the opening of the urethra and being aligned with said urethra so that said tube extends from said adaptation piece into said urethra;

means in fluid communication with said sac for connecting said sac with a source of air, whereby said sac may be inflated with and emptied of air; and

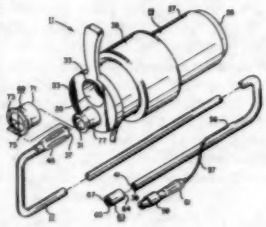
means in fluid communication with said adaptation piece for connecting said adaptation piece to a vacuum source for producing negative pressure between said adaptation piece and said urethra.

4,957,486

RECTAL-STOMAL INSERT APPARATUS AND METHOD

Emsley A. Davis, P.O. Box 942, McCamey, Tex. 79752

Filed Oct. 2, 1989, Ser. No. 416,064
Int. Cl.[5] A61M *29/00*
U.S. Cl. 604—96 **11 Claims**



8. An apparatus for insertion into an opening of a colon of a patient, comprising:

(a) an insertion member having an inner end to be inserted first into the opening, an opposite outer end, and an exterior surface;

(b) said insertion member comprising a first channel extending therethrough between said outer and inner ends for receiving instrumentation, and a second channel formed separate from said first channel extending through said insertion member between said outer and inner ends;

(c) occlusion means located around said insertion member for forming a seal between said exterior surface and the perimeter of said opening of the patient;

(d) a tube member having inner and outer ends, said tube member having an inside channel extending between said tube member inner and outer ends, said tube member having a length between its inner and outer ends so that the tube member can be inserted into the length of the colon from said opening;

(e) said tube member having an outside diameter that allows the insertion of said tube member into said second channel of said insertion member, said tube member being slidable within said second channel;

(f) said tube member inside channel having a diameter that

allows the insertion therein of tool means for use in said colon, wherein said tool means are slidable within said inside channel when inserted therein;

(g) said tube member having inflatable balloon means at its inner end, said balloon means blunting the inner end of said tube member when inflated, said balloon means encompassing said tube member inner end, said tube member inner end being insertable into said second channel when said balloon means is deflated, said tube member having an inflating passage extending between said tube member outer and inner ends, said inflating passage communicating with the interior of said balloon means while being separate from said inside channel, said inflating passage outer end being adapted to receive inflation means;

(h) cap seal means having an open end and a closed end, said open end for receiving said tube member outer end, said closed end having first seal means, said first seal means for providing a seal in said inside channel while allowing said tool means to be slidable therethrough;

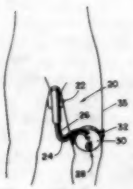
(i) second seal means for sealing said second channel around said tube member, said second seal means allowing said tube member to slide in said second channel.

4,957,487

EXTERNAL MALE URINARY CATHETER AND COLLECTION SYSTEM

Frank J. Gerow, Houston, Tex., assignor to Baylor College of Medicine, Houston, Tex.

Filed Dec. 30, 1988, Ser. No. 292,559
Int. Cl.[5] A61M *37/00*
U.S. Cl. 604—133 **34 Claims**



1. An external male urinary catheter and collection system, comprising

a generally tubular hollow body member having a distal closed end and a proximal open end for accommodating a portion of the male penis interiorly thereof,

a flexible thin-walled sleeve-like sealing member integrally extending from said proximal open end of said body member and oriented in concentric axial alignment therewith,

said sleeve-like sealing member having a wall thickness substantially less than the wall thickness of said body member and adopted to be rolled up over the open end of the adjacent portion of said body member to permit insertion of the distal end of the male penis therein,

said sleeve-like sealing member having a predetermined substantially constant inner circumferential dimension selected for permitting said sealing member to snugly contact the exterior surface of the non-erect penile shaft when returned to the unrolled extended position,

ambulatory evacuation means that is self-contained and independently operable for producing a negative pressure therein and capable of receiving and collecting urine interiorly thereof,

a drainage tube interconnecting the distal end of said body member and said evacuation means for providing fluid communication therebetween and permitting drainage of urine from said body member interior to said evacuation means for collection,

first one-way valve means cooperating with said drainage tube for permitting fluid flow through said drainage tube only in the direction from said body member to said evacuation means,

said negative pressure from said evacuation means being communicated through said drainage tube and first one-way valve means into the interior of said body member for cooperating with the inserted male penis for permitting it to expand to its anatomic limit in a simulation of an erection into the interior of said body member, said negative pressure introduced within said body member further acting on said thin-walled sleeve-like sealing member for collapsing said thin walls about a non-erect portion of the penile shaft and maintaining an air-tight seal therewith but not engaging the non-erect penile shaft tightly enough to restrict venous blood flow therein,

a second tube interconnecting the distal end of said body member and said evacuation means and said second tube communicating with said drainage tube through the interior of said body member,

a second one-way valve means cooperating with said second tube for permitting air flow therethrough only in the direction from said evacuation means to said body member, and

wherein said second tube and second one-way valve means cooperate with said evacuation means and body member for permitting an intermittent displacement of air therethrough from said evacuation means into said body member interior in response to the intermittent drainage of urine into said evacuation means through said drainage tube and first one-way valve means, and displacing sufficient urine in said drainage tube into said evacuation means for insuring that substantially no urine remains interiorly of said body member distal end.

4,957,488

THROUGH THE NEEDLE CATHETER DEVICE

Robert H. Cameron, Tampa, and Robert Doman, Lutz, both of Fla., assignors to Critikon, Inc., Tampa, Fla.

Filed Oct. 19, 1988, Ser. No. 259,649
Int. Cl.[5] A61M *5/00*
U.S. Cl. 604—161 **6 Claims**

1. A through the needle catheter device in which a catheter is located within a needle having a proximal end and a pointed distal end for accessing a patient comprising:

a needle assembly, including a housing having a patient-facing side and means, connected to the proximal end of said needle, for withdrawing said needle into said housing and splitting said needle; and

a catheter assembly including said catheter and suitable for engagement with said needle assembly, and capable of disengaging from said needle assembly from the patient-facing side of said housing.

4,957,489

THROUGH THE NEEDLE CATHETER INSERTION DEVICE AND TECHNIQUE

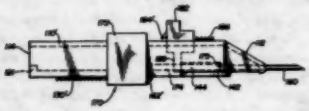
Robert H. Cameron, Tampa, and Robert Doman, Lutz, both of Fla., assignors to Critikon, Inc., Tampa, Fla.

Continuation-in-part of Ser. No. 259,649, Oct. 19, 1988. This application Oct. 20, 1988, Ser. No. 260,142
Int. Cl.[5] A61M *5/00*
U.S. Cl. 604—161 **3 Claims**

1. A through the needle catheter device in which a catheter

is located within a needle having a pointed distal tip comprising:

a needle assembly including a housing, said needle, and means, mounted on said housing and connected to said needle, for irreveribly withdrawing said needle from a blood vessel and splitting the needle; and



a catheter assembly suitable for external engagement with said housing and including said catheter, wherein said housing further includes means engaging said catheter assembly for irreversibly threading said catheter to extend from the tip of said needle and into a blood vessel.

4,957,490

INJECTION DEVICE

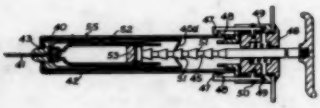
Phillip O. Byrne; Penelope R. Sisson, and Harry R. Ingham, all of Newcastle-upon-Tyne, England, assignors to National Research Development Corporation, London, England

Filed Dec. 10, 1987, Ser. No. 131,228

Claims priority, application United Kingdom, Dec. 16, 1986, 8630016

Int. Cl.[5] A61M *5/00*

U.S. Cl. 604—197 **13 Claims**



1. An injection device comprising a generally cylindrical barrel section, substantially closed at a first end thereof but having an aperture in said closed end to permit passage of an injection needle therethrough, a needle support member, an injection needle carried by said support member, said support member being dimensioned to fit within said barrel section and to move axially therein between a forward position in which said needle extends through said aperture and a rearward position in which said needle lies wholly within said barrel section, said needle support member further being shaped to receive one end of a liquid container also lying within said barrel section, a plunger, mounted at the second end of said barrel section for axial movement into and out of said liquid container, and connector means adapted to connect upon initiation of said plunger axial movement into said liquid container, said plunger to one of said liquid container and said support member, said plunger having a leading end portion, and a trailing end portion, said leading end portion being closer to said first end of said syringe barrel than said trailing end portion, said liquid container and said support member each having a leading end portion and a trailing end portion, said leading end portions of said liquid container and said support member being closer to said first end of said syringe barrel than said trailing end portion, said connector means having mutually connecting first and second members, the first member being located adjacent the leading end portion of said plunger relative to initial movement thereof into said liquid container and the second member being located at the trailing end portion of said one of said liquid container and said support member relative to said initial movement, whereby subsequent axial movement of said plunger in a direction away from said closed end of said barrel section moves said needle to said rearward position.

4,957,491

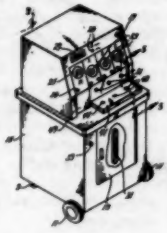
COMBINATION FLUID COLLECTION AND DISPOSAL APPARATUS

Richard D. Parker, 915 Olive St., Ste. 1620, St. Louis, Mo. 63101

Continuation of Ser. No. 169,302, Mar. 17, 1988, Pat. No. 4,863,446. This application Apr. 14, 1989, Ser. No. 339,191

Int. Cl.[5] A61M *1/00*

U.S. Cl. 604—317 **4 Claims**



1. A fluid collection apparatus for collecting fluids aspirated from a patient during surgical procedure comprising:

a reservoir for the temporary storage of fluids aspirated from the patient;

housing for the reservoir defined by spaced apart panels including a front panel;

a vacuum port in one of the panels of the housing for connection to a vacuum source;

filter means for preventing aspirated fluids from the patient from entering the vacuum source;

a vacuum line connecting the vacuum port to the reservoir;

a plurality of suction ports in the front panel of the housing, each for connection to a suction tube for aspirating fluids from the patient;

a plurality of suction lines connecting each of the suction ports to the reservoir for conducting fluid from each of the suction ports to the reservoir;

a plurality of suction control means mounted one of the panels of the housing, each control means controlling the suction at a corresponding suction port and being adapted for manipulation to select a vacuum pressure for the suction port from a range of vacuum pressures;

a gauge mounted on one of the panels of the housing for reading the vacuum pressure at each of the suction ports; and

a drain generally adjacent the bottom of the reservoir.

4,957,492

APPARATUS FOR COLLECTING AND HANDLING TISSUE DURING UTERINE EVACUATION PROCEDURE

W. Patrick McVay, Doylestown, Pa., assignor to Cabot Medical Corporation, Langhorne, Pa.

Filed Dec. 7, 1988, Ser. No. 280,946

Int. Cl.[5] A61M *1/00*

U.S. Cl. 604—319 **4 Claims**

1. In an apparatus for collecting tissue during evacuative medical procedures, wherein the apparatus includes a source of vacuum, a liquid collection bottle, a vacuum curette sized to enter a body cavity for withdrawing material during the procedure, a first hose connected between the source of vacuum and the bottle, and a second hose connected from the bottle to the vacuum curette, the improvement comprising:

a tissue trap connected in the hose from the vacuum curette to the collection bottle, externally of the bottle, for trapping tissue as evacuated material is drawn from a body cavity and into the bottle, said tissue trap including a filter element for receiving and holding tissue therein while passing liquid material to the bottle,

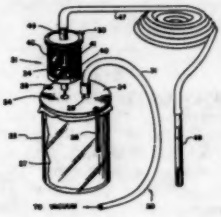
said liquid collection bottle having an open end closed by a

lid, said lid having a first fitting for attachment of the hose leading to the source of vacuum, and a second fitting for attachment of the tissue trap, said tissue trap having a fitting for complemental engagement with the fitting in the collection bottle lid to releasably hold the tissue trap to the collection bottle,

said filter element held in said housing beneath a cover and removable through the open end upon removal of the cover; and

including an open frame with an annular, radially outwardly directed flange thereon disposed in overlying relationship with the flange on the tissue trap housing,

said housing having a removable cover on one end,



said housing further having an open end and an opposite, closed end, said cover being on said open end and said fitting being on said closed end,

the open end of said tissue trap housing having a radially outwardly directed flange thereon disposed in overlying relationship with the filter element flange, thereby sandwiching the filter element flange between the housing flange and cover flange to seal and hold the filter element in place, and

a releasable sealing means engaged with the housing, cover and filter element to retain them in sealed, assembled relationship to one another.

4,957,493

METHOD OF AND DEVICE FOR PRESERVING BIOLOGICAL AND MEDICAL ACTION OF SUBSTANCES BASED ON ELECTRICAL CHARGE AND/OR STATE

Moysei Dobruskin, 483 Ocean Pkwy., Brooklyn, N.Y. 11218

Continuation-in-part of Ser. No. 126,872, Nov. 30, 1987, Pat. No. 4,894,061. This application Apr. 19, 1989, Ser. No. 340,268

The portion of the term of this patent subsequent to Jan. 16, 2007, has been disclaimed.

Int. Cl.[5] A61F 2/66; A61B 19/00

U.S. Cl. 604—403 **17 Claims**

16. A device for preserving biological and medical action of substances based on electrical charge and/or state, comprising

a container having a wall bounding an inner chamber for accommodating a substance; and

means for supplying additional energy to the substance so as to prevent decrease of electric charge and/or state of the substance accommodated in the inner chamber, said means including a layer associated with said wall and electrically charged so as to additionally charge the substance through said wall.

4,957,494

MULTI-LAYER DELIVERY SYSTEM

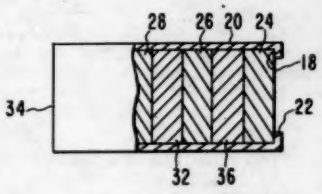
Patrick S. L. Wong, Palo Alto; Felix Theeuwes, and James B. Eckenhoff, both of Los Altos, all of Calif., assignors to ALZA Corporation, Palo Alto, Calif.

Continuation-in-part of Ser. No. 270,160, Nov. 14, 1988, abandoned, which is a continuation-in-part of Ser. No. 66,906, Jun. 25, 1987, Pat. No. 4,874,388. This application Dec. 13, 1988, Ser. No. 283,631

The portion of the term of this patent subsequent to Oct. 17, 2006, has been disclaimed.

Int. Cl.[5] A61K 9/24

U.S. Cl. 604—892.1 **37 Claims**



1. A drug dispenser for use in a fluid-containing environment comprising, in combination;

a. a rigid housing having an outlet at one end thereof;

b. a fluid activated driving member within a portion of said housing proximate the end of said housing opposite to said outlet and in contact with said housing, at least that portion of the housing containing the driving member having a predetermined permeation rate to the environmental fluid;

c. a first set of drug layers longitudinally disposed within said housing between said driving means and said outlet; and

d. a second set of layers longitudinally disposed within said housing and alternating with said first set of drug layers; wherein said first and second sets of layers are solids or semi-solids, or exhibit solid-like properties up to 31° C.; and whereby said first and second sets of layers are displaced towards said outlet by said driving member upon exposure of said dispenser to the fluid in said fluid-containing environment.

4,957,495

DEVICE FOR SETTING THE SPINAL COLUMN

Patrick Kluger, Fichtenstr. 5, D-3590 Bad Wildungen-Reinhardshausen, Fed. Rep. of Germany

PCT No. PCT/DE88/00208, § 371 Date Dec. 1, 1988, § 102(e) Date Dec. 1, 1988, PCT Pub. No. WO88/07357, PCT Pub. Date Oct. 6, 1988

PCT Filed Mar. 31, 1988, Ser. No. 290,104

Claims priority, application Fed. Rep. of Germany, Apr. 1, 1987, 3711091

Int. Cl.[5] A61B 17/60

U.S. Cl. 606—58 **13 Claims**

1. A device for setting a spinal column with damaged vertebrae, said device comprising

an axial guide member;

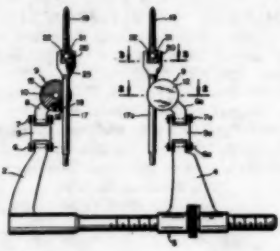
a first arm slideably mounted for axial movement on said guide member;

a second arm fixedly mounted to said guide member;

a separate mid-piece hingedly connected to each of said first and second arms;

a separate bracket hingedly connected to each said mid-piece; and

a separate hollow receiving piece carried by each bracket and adjustable in two planes for receiving an extension rod adapted for connection to a bone screw, said receiving



piece consisting of a cylindrical piece with a central axis having a generally tangential hole therethrough which is transverse to and offset from said central axis and means for fixing the position of said cylindrical piece.

4,957,496

SLOTTED SLIDE PLATE ASSEMBLY FOR OSTEOSYNTHESIS

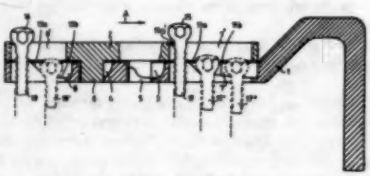
Joachim Schmidt, Cologne, Fed. Rep. of Germany, assignor to Mecron medizinische Produkte GmbH, Berlin, Fed. Rep. of Germany

Filed Nov. 13, 1989, Ser. No. 434,463

Claims priority, application Fed. Rep. of Germany, Nov. 11, 1988, 3838774

Int. Cl.[5] A61F *2/00*

U.S. Cl. 606—70 **9 Claims**



1. A slotted slide plate assembly for setting bones in a fracture area and exerting a pressure in a predetermined direction to obtain a bone compression, comprising

(a) a first plate element having a topside and an underside; said underside being adapted for a face-to-face engagement with a bone surface;

(b) a first throughgoing slide slot provided in said first plate element; the first slide slot having a length oriented parallel to said predetermined direction;

(c) a first slide ramp bounding said first slide slot and being oriented in said predetermined direction; said first slide ramp being inclined towards said underside in said predetermined direction;

(d) a second plate element having a topside and an underside; said underside of said second plate element being adapted for a face-to-face engagement with the topside of said first plate element;

(e) fitting means in said first and second plate elements for preventing a relative displacement, in said predetermined direction, between said first and second plate elements when said first and second plate elements are in a face-to-face engagement with one another;

(f) a second throughgoing slide slot provided in said second plate element; the second slide slot having a length oriented parallel to said predetermined direction; said second throughgoing slide slot overlapping ssic first slide slot when said first and second plate elements are in a face-to-face engagement with one another; said first and second slide slots forming a slide slot pair;

(g) a second slide ramp bounding said second slide slot and being oriented in said predetermined direction; said second slide ramp being inclined towards said underside of said second plate element in said predetermined direction; said first slide ramp being in alignment with and being a continuation of said second slide ramp when said first and second plate elements are in a face-to-face engagement with one another, whereby a tightening screw inserted through said slide slot pair from said topside of said second plate element slides, while being screwed into the bone, with a screw head on said second slide ramp and subsequently on said first slide ramp in said predetermined direction.

4,957,497

DEVICE FOR OSTEOSYNTHESIS

Thomas Hoogland; Hans E. Harder, and Klaus Behrens, all of Pfizer Inc., 235 E. 42nd St., New York, N.Y. 10017

Continuation of Ser. No. 233,954, Aug. 18, 1988, abandoned, which is a continuation of Ser. No. 790,713, Oct. 24, 1985, abandoned. This application Jul. 13, 1989, Ser. No. 380,701

Claims priority, application Fed. Rep. of Germany, Oct. 27, 1984, 8431616

Int. Cl.[5] A61F *5/04*

U.S. Cl. 606—71 **2 Claims**

1. A device for osteosynthesis comprising:

(a) an elongated bone plate having first and second longitudinal portions and having a bottom surface and an upper surface, said bottom surface being adapted to rest upon the patient's bone, said upper surface being oppositely disposed with respect to said bottom surface, with a plurality of elongated holes disposed in a longitudinally spaced arrangement for the reception of bone screws being provided in said second longitudinal portion of said bone plate, and a plurality of circular holes for the reception of bone screws being provided in said first longitudinal portion, and said first longitudinal portion being adapted to be screwed into the patient's bone on a first side of a fracture, and said second longitudinal portion being adapted to be screwed into the patient's bone on a second side of the fracture, and

(b) an elongated plate having an upper surface and a bottom surface which is adapted to be fitted on and slidable with respect to the upper surface of, and only on said second longitudinal portion of, said bone plate and provided with a plurality of longitudinally spaced circular holes each having a center and having a diameter approximately equal to the width of said elongated holes and a separation between two adjacent centers being substantially equal to the separation between the centers of two adjacent elongated holes, wherein said slide plate is curved in its transverse cross-section with the concave side of the slide plate being adapted to lie in close contact against said bone plate when the slide plate is fitted on the bone plate, wherein said bone plate defines a longitudinally extending channel having a channel bottom and opening towards the upper surface of the bone plate, with said elongated holes being located on said channel bottom and said slide plate being received and guided within said channel when the slide plate is fitted on the bone plate, wherein said bone plate has an approximately U-shaped transverse cross-section with the shape of said U-shaped transverse cross-section

being formed from legs having a height h, and wherein said bone plate has an upper surface exhibiting a tapered profile in the longitudinal direction with said height h of said legs of said U-shaped cross-section steadily decreasing from the center of said bone plate to the ends of said bone plate.

4,957,498

SUTURING INSTRUMENT

Richard B. Caspari, Maidens, Va.; Arthur F. Trott, Largo, and F. Barry Bays, Seminole, both of Fla., assignors to Concept, Inc., Largo, Fla.

Continuation of Ser. No. 117,158, Nov. 5, 1987, Pat. No. 4,890,615. This application Nov. 7, 1989, Ser. No. 432,886
The portion of the term of this patent subsequent to Jan. 2, 2007, has been disclaimed.
Int. Cl.[5] A61B *17/00*
U.S. Cl. 606—146 8 Claims

1. A suturing instrument comprising

an elongate member having a distal end and a proximal end;

first and second jaws disposed at said distal end of said elongate member to be movable relative to each other, said first jaw having an opening therein and said second jaw including means for penetrating tissue to be sutured and an opening therein;

means operable at said proximal end of said elongate member to move said first and second jaws from an open position spaced from each other to a closed position adjacent each other with said openings therein aligned; and

means for feeding suture material through said openings in said first and second jaws whereby suture material can be passed through tissue to be sutured after penetration by said second jaw with said first and second jaws in said closed position.

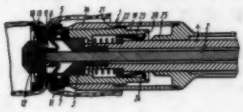
4,957,499

SURGICAL SUTURING INSTRUMENT

Viktor A. Lipatov, ulitsa Profsojuznaya, 91, korpus 3, kv.27; Igor A. Guskov, ulitsa Tulinskaya, 10, Korpus I, kv.80, and Nikolai N. Kanshin, ulitsa M. Filevskaya, 68, kv. 10, all of Moscow, U.S.S.R.

PCT No. PCT/SU88/00020, § 371 Date Mar. 9, 1989, § 102(e) Date Mar. 9, 1989, PCT Pub. No. WO89/00406, PCT Pub. Date Jan. 26, 1989
PCT Filed Jun. 27, 1988, Ser. No. 332,452
Claims priority, application U.S.S.R., Jul. 14, 1987, 4268008
Int. Cl.[5] A61B *17/00*
U.S. Cl. 606—153 13 Claims

1. A surgical suturing instrument for establishing circular compression anastomoses in the organs of the digestive tract, comprising a needle arrangement (5) accommodated in a hollow body (1) and having a first ring-shaped element (6) with a plurality of holes (8), and a second ring-shaped element (7) coaxial with the first one and carrying a number of needles (9) fixed in position thereon, each of said needles corresponding to one of the holes (8) in the first ring-shaped element (6), while at least part of the needles have a locking cone (10) at the free end thereof; a rod (2) accommodated in the hollow body (1), said rod carrying at one of its ends a connecting ring (13) fixed stationary with the aid of a nut (12), the connecting ring being adapted for the needles (9) to pass through when establishing an anastomosis and those needles which have a locking cone (10) get secured in position in the connecting ring (13), a hollow cylindrical knife (3) having such an inside diameter that enables the nut (12) to pass freely therethrough, the knife being held to a hollow tube (4) which is arranged coaxially in the hollow body (1) and which accommodates the rod (2) located coaxially therewith, and a mechanical actuator of the hollow cylindrical knife (3) adapted to interact with the hollow tube (4), characterized in that it has a pusher (19) upon one of whose ends rests the second ring-shaped element (7) of the needle



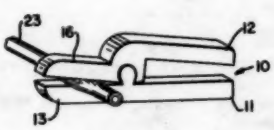
arrangement (5), while its other end has a hollow chamfer (20) and a stop (21) which is adapted to interact with a stop (22) of the hollow body (1) so as to restrict the travel of the second ring-shaped element (7) in the course of anastomosing, a split bush (23) fitted on the hollow tube (4) and having an outside taper collar (24) adapted to engage the hollow chamfer (20) of the pusher (19) and a retainer (25) of the split bush (23) located on the hollow tube (4) inside the split bush (23).

4,957,500

NORMALLY CLOSED CLAMP

Marc D. Liang; Krishna Narayanan, both of Pittsburgh, and Eugene D. Ross, Southampton, all of Pa., assignors to Montefiore Hospital Association of Western Pennsylvania, Pittsburgh, Pa.

Filed Oct. 27, 1988, Ser. No. 263,518
Int. Cl.[5] A61B *17/08*
U.S. Cl. 606—157 17 Claims



1. A device for use as a normally closed clamp or a separator, said device being formed from two connected elements including:

(a) a base element having a base jaw member, a base handle member and a central, non-circular arcuate cam member;

(b) a clamping element having a clamping jaw member, a clamping handle member and a central, non-circular arcuate cam engaging member;

(c) said base element being secured to said clamping element by engagement of at least a portion of said central, non-circular arcuate cam engaging member with at least a portion of said central non-circular cam member;

(d) the said base jaw member and the said clamping jaw member having confronting surfaces which are in proximity when the said cam engaging member conforms to the surface of said arcuate cam member;

(e) said base handle member and said clamping handle member being spaced apart when said cam engaging member conforms to the surface of said arcuate cam member;

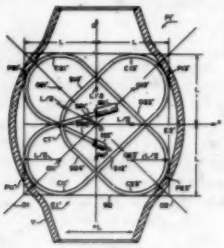
(f) the arcuate shape of said arcuate cam member and said

arcuate cam engaging surface being such that when the said base handle member and the said clamping handle member are drawn together, the said clamp jaw member separates from the said base jaw member and the said arcuate cam engaging member is flexed and the flexure establishes a positive force to return said cam engaging member and the said cam member to the normal position with the said jaw members in proximity.

4,957,501
ANTI-EMBOLIC FILTER

Michel A. Lahille, Vauhallan, and Alain J. Dibie, Paris, both of France, assignors to Biomat, S.A.R.L., Vauhallan, France

Filed Dec. 27, 1988, Ser. No. 290,275
Claims priority, application France, Dec. 31, 1987, 87 18472; Jun. 15, 1988, 88 08031
Int. Cl.[5] A61M *29/00*
U.S. Cl. 606—200 **21 Claims**

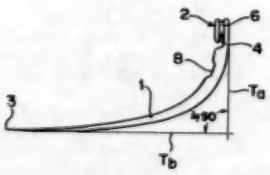


1. An anti-embolic filter for implantation in a physiological canal, said filter comprising a single flexible wire, and means connected with said wire for anchoring said filter in a physiological canal, said wire having been subjected to a primitive predeformation into first and second substantially flat superposed loops, said loops being substantially symmetrical respectively with regard to two axes which are substantially orthogonal and convergent at a centre of said filter.

4,957,502
SURGICAL NEEDLE FOR PLASTIC SURGERY OR THE LIKE

Haruo Takase, 20-16, 3-chome, Shimoochiai, Shinjuku-ku, Tokyo, Japan

Filed Aug. 22, 1989, Ser. No. 396,679
Int. Cl.[5] A61B *17/00*
U.S. Cl. 606—223 **4 Claims**

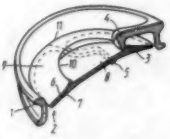


1. A surgical needle for suturing tissue, which comprises:
a curved needle body which includes a rear part having a large curvature and provided at its rear end portion with thread retaining means, a middle part having a small curvature and a leading part having a very small curvature wherein substantially one-fifth of the length of said rear part of said needle is at a substantially right angle to a tangent line with respect to said leading part.

4,957,503
HEART VALVE PROSTHESIS

Alexandr S. Bukatov, ploschad Pobedy, 1, korpus "A", kv. 122; Naum A. Iofis, Lomonosovsky prospekt, 23, kv. 416; Jury G. Egorov, Sevastopolsky prospekt, 83, korpus 1, kv. 28; Natalya B. Dobrova, ulitsa Matrosskaya tishina, 17, kv. 26; Anatoly S. Kostretsov, ulitsa Bakuninskaya, 10/12, kv. 7, and Andrei V. Agafonov, ulitsa Smolnaya, 63, kv. 149, all of Moscow, U.S.S.R.

PCT No. PCT/SU88/00137, § 371 Date Feb. 24, 1989, § 102(e) Date Feb. 24, 1989, PCT Pub. No. WO88/10105, PCT Pub. Date Dec. 29, 1988
PCT Filed Jun. 23, 1988, Ser. No. 335,790
Claims priority, application U.S.S.R., Jun. 25, 1987, 4261093
Int. Cl.[5] A61F *2/24*
U.S. Cl. 623—2 **2 Claims**

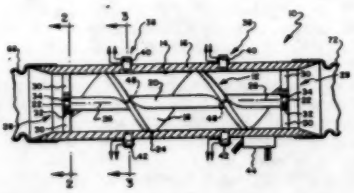


1. A heart valve prosthesis comprising:
(a) a valve ring (1) having an opening (2) for the passage of blood, and suport structures (4,5); and
(b) a valve poppet (3) floatingly mounted in the opening (2) and having a distal side (6) and a proximal side (7) engageable by the support structures (4,5) respectively, to thereby limit the motion of the poppet (3), said distal side (6) and proximal side (7) having a concave shape with a radius of curvature whose centers are on opposed sides of the valve, wherein a periphery of said distal side (6) and a periphery of said proximal side (7) form a smoothly surfaced edge along the entire circumference of the poppet (3) and said concave distal and proximal sides diverge inwardly away from said smoothly surfaced edge.

4,957,504
IMPLANTABLE BLOOD PUMP

William M. Chardack, 547 Golfview Dr., Gulfstream, Fla. 33444

Filed Dec. 2, 1988, Ser. No. 278,788
Int. Cl.[5] A61M *1/10*
U.S. Cl. 623—3 **9 Claims**



1. An implantable and biocompatible blood pump capable of providing either continuous or pulsatile blood flow, the pump comprising:
a stator having a cylindrical opening;
bearing means carried by the stator and extending across the cylindrical opening;
a rotor supported by the bearing means for rotation about

the axis of the cylindrical opening, the rotor being in the form of a helix; and

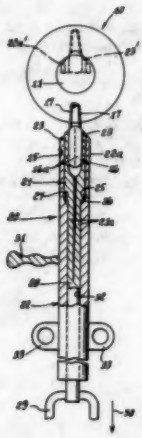
electromagnetic means carried by the stator for driving the rotor.

4,957,505

CANNULATED SPRING FORCEPS FOR INTRA-OCULAR LENS IMPLANTATION METHOD

Henry H. McDonald, 65 N. Madison, Suite 810, Pasadena, Calif. 91101

Filed Nov. 3, 1989, Ser. No. 431,332
Int. Cl.[5] A61F *2/16, 9/00*; A61B *17/00*
U.S. Cl. 623—6 **11 Claims**



1. The method of intraocular implantation of a plastic lens in the eye lens zone within a lens capsule from which a natural lens has been removed, and via a surgical incision in the corneo-scleral limbus, the method employing a surgical forceps having blades projecting beyond arm portions, the blades clamping the plastic lens which has haptic loops attached thereto, the method also employing an elongated cannula, including:

(a) receiving said arm portions and folded lens in the cannula to position the folded lens in the forward end of the cannula, with the haptic loops in predetermined positions relative to the folded lens, and to the cannula,

(b) introducing said forward end of the cannula into the eye via said incision and into proximity to said lens zone,

(c) relatively displacing the cannula and said forceps to controllably retract the forward end of the cannula relative to the blades and folded lens, thereby allowing the haptic loops to move away from the folded lens and toward walls defined by the lens capsule,

(d) continuing said relative displacement of the cannula and forceps to effect relative separation of the blades, thereby accommodating unfolding release of the folded lens in the capsule whereby the haptic loops then position the unfolded lens in the lens zone in the capsule,

(e) continuing said relative displacement of the cannula and forceps to effect movement of the blades relatively toward one another,

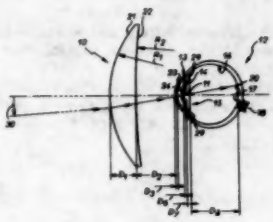
(f) and retracting the cannula and forceps from the eye, via said incision.

4,957,506

OPTICAL SYSTEM USING AN OPHTHALMIC LENS AND AN INTRA-OCULAR LENS TO IMPROVE THE SIGHT OF A PERSON SUFFERING FROM MACULAR DEGENERATION

Jean-Louis Mercier, Fontenay Les Briis, France, assignor to Essilor International Cie Generale d'Optique, Fontenay Les Briis, France

Filed Aug. 30, 1989, Ser. No. 400,871
Claims priority, application France, Sep. 6, 1988, 88 11623
Int. Cl.[5] A61F *2/16*
U.S. Cl. 623—6 **8 Claims**



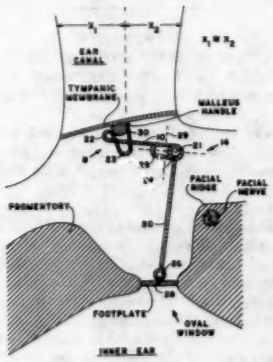
1. Optical system for improving the sight of a person suffering from macular degeneration comprising a high positive power ophthalmic lens adapted to be disposed in front of the eye to be treated and a high negative power intra-ocular lens adapted to be implanted in the eye to be treated after removal of its crystalline lens, wherein at least one surface of each lens is an aspherical surface of revolution, and the aspherical surface of revolution of each lens having a generatrix that is a conic section.

4,957,507

WIRE SPRING PROSTHESIS FOR OSSICULAR RECONSTRUCTION

Edmundas Lenkauskas, 3024 Kersdale Rd., Pepper Pike, Ohio 44124

Filed Dec. 14, 1987, Ser. No. 132,782
Int. Cl.[5] A61F *2/18*
U.S. Cl. 623—10 **13 Claims**



1. A prosthesis for ossicular reconstruction mountable between the tympanic membrane and the footplate of the middle ear comprising:

a spring means;

a lower arm having one end connected to the spring means

and a second end having means for connection to the footplate;

an upper arm having one end connected to the spring means and a second end having means for connection to the tympanic membrane;

said upper and lower arms defining a plane and forming an enclosed angle therebetween; and

said spring means including an oval coil oriented substantially parallel to said plane and substantially within the enclosed angle thereby minimizing contact of the coiled spring means with the walls of the middle ear.

4,957,508

MEDICAL TUBES

Noriaki Kaneko; Yoshimi Hirata, and Masahiro Moriwaki, all of Yokohama, Japan, assignors to Ube Industries, Ltd., Yamaguchi, Japan

Filed Oct. 30, 1987, Ser. No. 114,499

Claims priority, application Japan, Oct. 31, 1986, 61-258369

Int. Cl.[5] A61F 2/06, 2/04

U.S. Cl. 623—12 **4 Claims**

1. An implantable tubular synthetic prosthesis for repairing or replacing tubular vessels which comprises a porous, high molecular weight elastomeric tube made of an elastomer selected from the group consisting of polyurethane, polyurethane urea, mixtures of polyurethane and polyurethane urea and mixtures of polyurethane and polyurethane urea with a silicone polymer, said elastomeric tube having an internal and external surface, wherein the internal surface exhibits a dilating force and the external surface exhibits a shrinking force such that the end portions of the tube dilates outwardly towards the external surface of the tube and said tube further dilating along its cut end portions to the external surface thereof when it is cut at any random position along the tube, transverse to its longitudinal direction, said dilation occurring in the area within 5 mm from said ends and cut ends, respectively, and the dilated maximum inner diameter is 1.4 times the inner diameter thereof.

4,957,509

CERAMIC IMPLANT MATERIALS

Nobuyuki Tamari; Isao Kondoh, and Nakoto Kinoshita, all of Ikeda, Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan

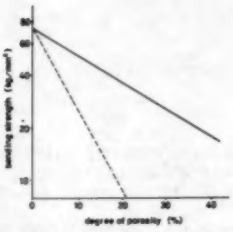
Continuation of Ser. No. 19,843, Feb. 27, 1987, abandoned. This application Aug. 24, 1989, Ser. No. 398,315

Claims priority, application Japan, Feb. 28, 1986, 61-44325

Int. Cl.[5] A61F 2/28

U.S. Cl. 623—16 **6 Claims**

1. A ceramic implant consisting essentially of a matrix comprising zirconia or silicon nitride ceramic, wherein the matrix is a porous one having a porosity of 15 to 40%, contains a substance adapted to living tissue in the pores thereof, and contains silicon carbide whiskers in the amount of 10 to 45% based on the volume of the matrix excluding the volume of the pores therein, wherein said substance adapted to living tissue is at least one compound selected from the group consisting of collagens, mucopolysaccharides and calcium phosphates, this substance being deposited in the pores of said matrix by being applied in the form of an aqueous solution or slurry thereof and then being dried and solidified, and wherein the ceramic matrix, in the case of zirconia, is in a phase selected from the group consisting of cubic, tetragonal and monoclinic, and, in the case of silicon nitride, is in a phase selected from the group consisting of trigonal and hexagonal.



4,957,510

HIP PROSTHESIS STRUCTURE ADAPTED FOR EASY FITTING TO THE PATIENT COXO-FEMURAL ARTICULATION

Patrizio Cremascoli, Via Clemente Prudenzio, 14/16 -- 20138 Milan, Italy

Filed Jul. 26, 1988, Ser. No. 224,454

Claims priority, application Italy, Aug. 3, 1987, 12023 A/87

Int. Cl.[5] A61F 2/36

U.S. Cl. 623—23 **1 Claim**

1. A hip prosthesis comprising an elongated oval cross-section stem, said stem having a first set curvature, a plurality of longitudinal extending slots formed on said stem, said stem including a first pointed end portion and an opposite enlarged second end portion, said enlarged portion having a second set curvature different from said first set curvature of said stem, a plurality of spaced bone gripping grooves formed on said enlarged end portion, an oval cross-section seat formed in said enlarged portion and a coupling element for coupling said stem to a prosthesis head, said coupling element including a middle body and two coupling element end portions integral with and on opposite ends of said middle body, one of said end portions having an oval cross-section for engaging in said seat and the other of said end portions having a frustum of cone shape, said coupling element being so designed that, as said oval cross-section end of said coupling element is engaged in said seat, said middle body and said other end portion of said coupling element provide an extension having a curvature substantially corresponding to said second set curvature of said enlarged end portion of said stem.

4,957,511

COAL-WATER DISPERSION AGENT

Helena Ljusberg-Wahren, Soderhamn, Sweden, assignor to Bergvik Kemi AB, Sweden

Filed Mar. 19, 1984, Ser. No. 590,830
Claims priority, application Sweden, Mar. 18, 1983, 8301502
Int. Cl.[5] C10L *1/32*
U.S. Cl. 44—51 15 Claims

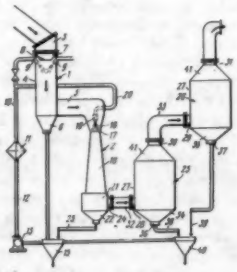
1. A coal-water dispersion comprising coal particles dispersed in water and a dispersing agent in an amount of 0.1–5% by weight of the dispersion, wherein the dispersing agent is a tall oil pitch partially esterified with a polyalkylene glycol compound mainly being composed of ethylene oxide units, and having an average molecular weight of above 600, said dispersing agent having a residual acid value higher than 3.

4,957,512

METHOD OF CLEANING GAS FROM SOLID AND GASEOUS MATTER AND APPARATUS MATERIALIZING SAME

Vladimir F. Denisov, ulitsa B. Tulskaya, 2, kv. 547; Marina I. Gertseva, ulitsa Udaltsova, 4, kv. 188; Valentin E. Ziberov, ulitsa Voronezhskaya, 38/43, kv. 309, all of Moscow; Vadim K. Karapetian, ulitsa Kakhoiana, 6, kv. 33; Norik S. Sarkisian, ulitsa Komsomolskaya, 197, kv. 12, both of Alaverdy; Vladimir M. Karbachinsky, ulitsa Butlerova, 2, korpus 1, kv. 11, Moscow; Oleg I. Kharlamov, Leninsky prospekt, 125, korpus 2, kv. 240, Moscow; Alexei D. Tsoi, pereulok Vasnetsova, 11, kv. 158, Moscow; Mark I. Tsysin, Litovsky bulvar, 6, korpus 1, kv. 179, Moscow; Alexei A. Romanov, ulitsa Lenskaya, 3, korpus 2, kv. 423, Leningrad; Vagan D. Veranian, 1 kvartal, 13, kv. 14, Alaverdy, poselok Sanain; Vasily D. Khripin, Moskovskoe shosse, 39, korpus 4, kv. 13, Ryazan, and Larisa E. Shafran, Leningradsky prospekt, 75b, kv. 121, Moscow, all of U.S.S.R.

Filed Aug. 25, 1989, Ser. No. 398,670
Int. Cl.[5] B03C *1/00*
U.S. Cl. 55—8 17 Claims



1. A method of cleaning gas from solid and gaseous matter pursuant whereto

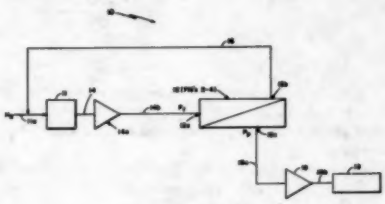
a gas stream is scrubbed in a first stage and in a second stage of scrubbing with a liquid in a cocurrent flow, whereby a stream of gas/liquid mixture is formed; said stream of gas/liquid mixture is cooled in the course of said scrubbing of the gas stream with the liquid, a liquid phase is separated from said stream of gas/liquid mixture which contains solid mater present in the gas, and the liquid phase is disposed of; in the course of scrubbing the gas stream with the liquid, said gas stream is admitted into said first stage of scrubbing with said liquid at a velocity of 30–40 m/s and said gas is being cooled to the temperature of its adiabatic saturation; for said second stage of scrubbing the gas stream with the liquid, said stream of gas/liquid mixture is admitted at a velocity of 50–70 m/s and said gas is coold to 40°–50° C.; said solid and gaseous matter contained in the gas is electrically precipitated at a field strength of 5–9 kV/cm, whereby the velocity of said stream of gas/liquid mixture is 3–4 m/s in passing through said electric field; said gas is cooled to 20°–25° C. in the course of said electrostatic precipitation of said solid and gaseous matter present in the gas.

4,957,513

METHOD OF PURIFYING A MIXED H_2/H_2SE VAPOR STREAM

Kelly L. St. Hilaire, Hollis, N.H., assignor to Raytheon Company, Lexington, Mass.

Filed May 10, 1989, Ser. No. 349,661
Int. Cl.[5] B01D *53/22, 71/68*
U.S. Cl. 55—16 14 Claims



1. A method of separating a mixed flow including hydrogen selenide, comprises the steps of:

introducing said mixed flow of hydrogen selenide into a compressor to provide a pressurized mixed flow having a first pressure;

feeding said pressurized mixed flow into a gas separator having a polymer membrane and a feed inlet to receive the pressurized mixed flow, a retentate outlet to provide a residual flow depleted in hydrogen selenide, and a permeate outlet to provide a flow enriched in hydrogen selenide; and

providing a pressure drop across the membrane and a compression ratio of inlet pressure (P_f) to permeate pressure (P_p), to extract a flow enriched in hydrogen selenide from the permeate outlet of the gas separator.

4,957,514

HYDROGEN PURIFICATION

Timothy C. Golden; Ravi Kumar, both of Allentown, and Wilbur C. Kratz, Macungie, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Feb. 7, 1989, Ser. No. 307,438
Int. Cl.[5] B01D *53/04*
U.S. Cl. 55—26 9 Claims

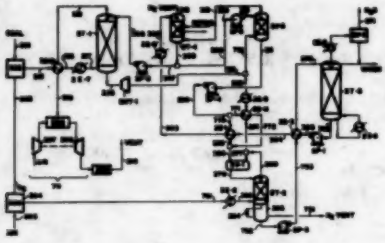
1. The pressure swing adsorption method of purifying an impure hydrogen gas stream containing a dilute contaminant of CH_4 which method comprises: passing said stream at superatmospheric pressure through an adsorbent bed of a zeolite obtained by replacing at least a portion of the sodium cation of sodium X-zeolite by barium ions to absorb said CH_4 contaminant and recovering purified hydrogen as unsorbed effluent, depressurizing the adsorbent bed, purging the adsorbent bed with product hydrogen and repressurizing the adsorbent bed with product hydrogen.

4,957,515

PROCESS FOR SULFUR REMOVAL AND RECOVERY FROM FUEL GAS USING PHYSICAL SOLVENT

William P. Hegarty, Allentown, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Nov. 3, 1988, Ser. No. 266,741
Int. Cl.[5] B01D *19/00*
U.S. Cl. 55—43 3 Claims



1. A process for producing a hydrogen sulfide-free fuel gas for combustion in a gas turbine to produce power using a raw fuel feed gas from an oxygen-enriched gasification, comprising the steps of:

(a) introducing a raw fuel feed gas from a gasification, which gas is contaminated with hydrogen sulfide and carbon dioxide, into a first separation zone;

(b) contacting said raw fuel feed gas with a carbon dioxide-loaded liquid solvent selective for said hydrogen sulfide in said first separation zone;

(c) removing a hydrogen sulfide-free, carbon dioxide-containing fuel gas from said first separation zone, combusting the fuel gas in a gas turbine and recovering power from the gas turbine;

(d) removing a hydrogen sulfide-rich, carbon-dioxide-containing solvent from said first separation zone, reducing said solvent in pressure and combining it with either the combined stream containing carbon dioxide and nitrogen stripping gas of step (h) or the second hydrogen sulfide-rich solvent of step (e);

(e) separating at least the combined stream of step (h) into a final carbon dioxide and nitrogen stream and a second hydrogen sulfide-rich solvent containing residual carbon dioxide by contacting at least the combined stream with a carbon dioxide-loaded solvent in a second separation zone;

(f) separating a carbon dioxide-rich stream containing residual hydrogen sulfide from said second hydrogen sulfide-rich solvent containing residual carbon dioxide;

(g) stripping said residual carbon dioxide containing residual hydrogen sulfide from said second hydrogen sulfide-rich solvent of step (f) with nitrogen-rich gas at a pressure below approximately 300 psia;

(h) combining said carbon dioxide-rich stream of step (f) and the residual carbon dioxide containing nitrogen stripping gas of step (g) to produce a combined stream containing carbon dioxide and nitrogen stripping gas;

(i) stripping the hydrogen sulfide from said second hydrogen sulfide-rich solvent in a regeneration zone using steam to recover a hydrogen sulfide-rich product stream and a hydrogen sulfide-lean solvent; and

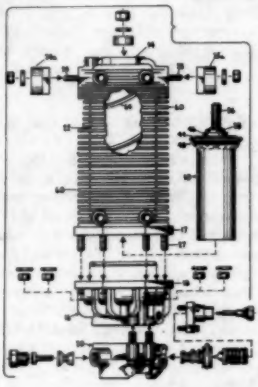
(j) contacting the final carbon dioxide and nitrogen stream of step (e) with the hydrogen sulfide-lean solvent of step (i) in a third separation zone to recover a carbon dioxide-loaded liquid solvent for introduction in said first separation zone and to recycle carbon dioxide to said fuel gas of step (c).

4,957,516

INVERSE FLOW DEPTH FILTER ASSEMBLY

Keith L. Daniels, Birdsboro, Pa., assignor to Reading Technologies, Inc., Reading, Pa.

Continuation-in-part of Ser. No. 112,256, Oct. 22, 1987, Pat. No. 4,822,387. This application Feb. 14, 1989, Ser. No. 310,729
The portion of the term of this patent subsequent to Apr. 18, 2006, has been disclaimed.
Int. Cl.[5] B01D *46/00*
U.S. Cl. 55—218 25 Claims



1. An inverse flow depth filter assembly with at least one gas permeable filter element, said depth filter assembly comprising:

an elongated assembly housing with a top, a bottom and walls having an exterior surface and an interior surface defining an open internal cross-section, the assembly housing having gas inlet means and gas egress means communicating with said internal cross-section, the gas inlet means and the gas egress means being disposed adjacent said top, and drain means at said bottom, the top having an underside, the gas inlet means opening into the internal cross-section at a point below a point at which the gas egress means opens into the internal cross-section;

a filter cartridge comprising a generally hollow filter housing with a gas impermeable material of lesser circumference than said internal cross-section of said assembly housing and including an open, gas permeable cartridge bottom and a cartridge top with a passage leading to the gas egress means, the filter cartridge being suspended from said underside of the top said assembly housing so that a substantially annular channel is defined between said walls of the housing and said impermeable filter housing of the cartridge, a filter material being disposed in the filter housing, the filter material being a non-absorptive fibrous material operable to coalesce droplets from passing gas;

cartridge receiving means in said top of the assembly housing, including an annular lip for sealing the filter cartridge to the assembly housing between the gas inlet mean sand the gas egress means, such that gas passes from the gas inlet means along the annular channel and through the filter cartridge to the gas egress means, the filter cartridge having a sectional base including continuous upright sections sealed to a collar and forming gas egress ports communicating with the gas egress means, and an annular raised collar sealed to said lip and said upright sections, and sized to form a circumferential seal with said filter housing; and,

heat exchange means adapted to lower the temperature of passing gas, including a thermally conductive material disposed between the interior surface and the exterior

surface of the assembly housing for heat exchange through the assembly housing;

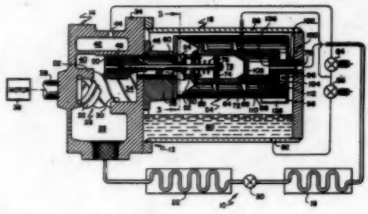
whereby gas moves through said assembly housing along the path through said inlet means, downward through said annular channel, and upward through said filter cartridge to exit through said gas egress means, said heat exchange means being operable to condense vapor from the gas, vapor droplets and gas through the filter, said droplets and condensates collecting at the bottom of said assembly housing, to be drained from said filter assembly through said drain.

4,957,517

SOUND ATTENUATING LIQUID-GAS SEPARATOR

Peter J. Linnert, La Crosse, Wis., assignor to American Standard Inc., New York, N.Y.

Filed Apr. 28, 1989, Ser. No. 345,147
Int. Cl.[5] B01D *19/00*
U.S. Cl. 55—184 **21 Claims**



1. Oil separation apparatus for a screw compressor, comprising:

housing means, defining a sump, for storing oil which has been separated from a gas compressed within said compressor;

an oil separator element, disposed interior of said sump housing means, said separator element including a cylindrical outer shell and a cylindrical inner column between which a helical flow path is defined, said outer shell being solid along said helical flow path so that the entirety of the mixture discharged from said compressor is constrained to travel the entire length of said helical flow path within the confines of the solid portion of said outer shell and said outer shell defining at least one aperture, downstream of said helical flow path, through which oil separated from said gas passes into said sump; and

means for abating noise, including a pair of generally tubular nested members, said means for abating noise defining a flow path downstream of said helical flow path, through which gas from which oil has been separated within said separator element must pass in order to exit said housing means and a first one of said nested pair of generally tubular members penetrating said separator element without physically contacting said separator element in the location of said penetration.

4,957,518

ASSEMBLY USEFUL FOR RETAINING COMPONENTS SUCH AS A FILTER TO A CONTAINER AND A CORRESPONDING COMBINATION

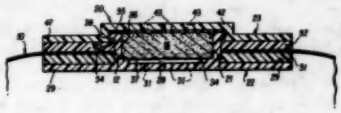
Gilbert W. Brassell, 13237 W. Eighth Ave., Golden, Colo. 80401

Filed Jun. 6, 1989, Ser. No. 362,152
Int. Cl.[5] B01D *53/04*
U.S. Cl. 55—316 **24 Claims**

1. An assembly for retaining a filter element in alignment with an opening through a wall, comprising:

a base plate for positioning on one side of the wall in alignment with the opening, the base plate having a projecting flange for passage through the opening, the projecting flange defining a sidewall of a chamber for receiving said filter element and the projecting flange being positioned inboard of the periphery of the base plate to define a first flange portion between the periphery and the projecting flange, the base plate having a vented floor portion;

a cap plate comprising a second flange portion and a vented center portion, the cap plate cooperating in fixed relation



with the base plate to close the chamber containing the filter element to retain the filter element therein, with the second flange portion on the cap plate being in alignment with the first flange portion on the base plate; and

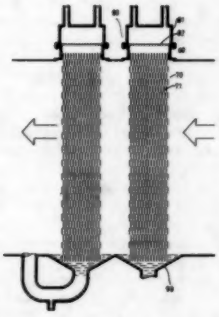
sealing means disposed between the first and second flange portions for sealing engagement with opposite surfaces of the wall adjacent the opening.

4,957,519

AIR-CLEANING APPARATUS

Chi-Shiang Chen, No. 15, Chung-Shan Rd., Su-Ao Chen, Ilan Hsien, Taiwan

Filed Jun. 26, 1989, Ser. No. 372,438
Claims priority, application Taiwan, May 4, 1989, 78103433
Int. Cl.[5] B01D *47/00*
U.S. Cl. 55—233 **7 Claims**



1. An apparatus for removing undesired particles or gases from an exhaust discharged from an exhaust pipe, comprising:

a frame support including a first lateral wall having an inlet adapted for receiving said exhaust, and a second lateral wall opposite to said first lateral wall having an outlet for expelling said exhaust;

a plurality of filtering members each being removably inserted between said first and second lateral walls, each filtering member comprising a hollow peripheral frame having a filter membrane secured thereto, said membrane having a plurality of perforations formed thereon;

said frame support including means for supporting each of said filtering members in substantially parallel spaced relationship whereby each of said filtering members may be removed from said frame support independently of the others of said filtering members;

means for supplying a stream of a cleaning liquid and allowing said stream of cleaning liquid to flow against said filtering member and spread over a major portion of said perforations;

wherein said perforations are dimensioned such that a liquid

film is effectively formed thereon after said cleaning liquid flows over said filtering member; and

means for collecting said cleaning liquid flowing over said filtering member.

4,957,520

APPARATUS FOR THE REMOVAL OF VAPORS AND VAPOR PRODUCTS

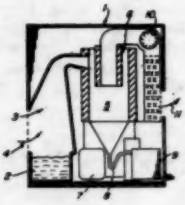
Michel Parmentier, Haroue, and Jean-Charles Weber, Dombasle, both of France, assignors to France Grignotage S.A.R.L., Dombasle, France

Filed Apr. 19, 1989, Ser. No. 341,544

Claims priority, application France, Apr. 19, 1988, 88 05324

Int. Cl.[5] B01D *53/04, 53/24*

U.S. Cl. 55—269 **9 Claims**



1. An apparatus requiring reduced maintenance and cleaning, for removing vapors and condensable and non-condensable products carried by said vapors for placement above a system for cooking food products in water or oil, and having a hood, a cyclone having upper and lower portions, means for recovering the condensable products and an absorption filter, said apparatus comprising:

(a) a hood for receiving vapors and condensable and non-condensable products carried by said vapors and communicating with upper portions of the cyclone;

(b) a cyclone under a partial vacuum relative to the hood for separating condensable products from non-condensable products wherein the condensable products condense against the cooled walls of the cyclone over the path of gases circulating through the cyclone thereby cleaning the walls on a continuous basis with streaming of condensed water, and wherein the non-condensable products are diverted to an absorption filter;

(c) an absorption filter located at an outlet of the cyclone for trapping non-condensable products; and

(d) recovering means in a lower portion of the cyclone for recovering condensable products including a syphon.

4,957,521

PACKET STRIP

John S. Cullen, and Edgard Matrak, both of Buffalo, N.Y., assignors to Multiform Desiccants, Inc., Buffalo, N.Y.

Filed Jun. 23, 1986, Ser. No. 877,310

Int. Cl.[5] B01D *53/04*

U.S. Cl. 55—387 **7 Claims**

1. A strip of packets comprising a plurality of packets fabricated from a strip of heat-fusible material and oriented in end-to-end relationship, each of said packets including wall means and a fused seam and fused end portions, said fused seams of said packets being in alignment and extending longitudinally of said strip, sections on said strip between said wall means, said fused end portions of said packets being located in said sections, said fused end portions extending transversely to said fused seams for sealing the ends of said packets, said fused seams being continuous and extending through said fused end portions, said fused end portions of adjacent packets being located in end-to-end relationship, means in each of said sections for providing a line of sight therethrough for permitting a sensor to read a signal, bulk material in each of said packets, said means in each of said sections comprising a perforation, said perforations extending through a portion of said fused

seam in each of said sections, and each of said perforations including a fused grommet-like border.

4,957,522

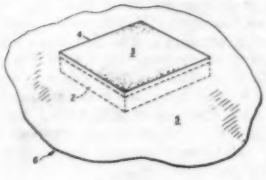
COMBINATION OF A FILTER AND A MATERIAL PERMEABLE TO GASES BUT IMPERMEABLE TO LIQUIDS

Gilbert W. Brassell, 13237 W. Eighth Ave., Golden, Colo. 80401

Filed Jun. 6, 1989, Ser. No. 362,151

Int. Cl.[5] B01D *53/04*

U.S. Cl. 55—316 **4 Claims**



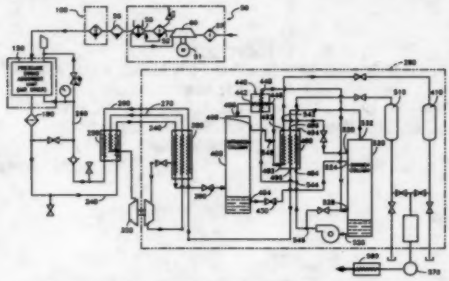
1. In combination with a container for containing radioactive material, wherein the container vents gases to the atmosphere through an opening in the wall of the container, a filter element comprised of an activated carbon or carbon-carbon composite disposed in the opening of the container with a first surface facing into the container and a second surface interfacing the atmosphere to which the container vents for filtering out radioactive material from vent gases passing from the container, through the filter element and to the atmosphere; a layer of material completely covering the second surface of the filter element, the material being impermeable to liquid and permeable to vapor thereby allowing filtered vapor to vent from the container while preventing liquid water from entering the container through the filter element.

4,957,523

HIGH SPEED PRESSURE SWING ADSORPTION LIQUID OXYGEN/LIQUID NITROGEN GENERATING PLANT

Robert A. Zarate, Ontario; Richard E. Self, Los Alamitos, and Lee W. Smith, El Toro, all of Calif., assignors to Pacific Consolidated Industries, Orange, Calif.

Continuation of Ser. No. 302,822, Jan. 27, 1989, abandoned. This application Oct. 19, 1989, Ser. No. 425,363
Int. Cl.[5] F25J 5/00
U.S. Cl. 62—13 9 Claims



1. A system for manufacturing liquid oxygen and liquid nitrogen from ambient air, comprising:

an air compressor assembly including an inlet port and an outlet port, said assembly drawing ambient air containing oxygen and nitrogen through said inlet port and compressing said ambient air into a stream of compressed air and forcing said air stream through said outlet port;

a HEPA-grade filter through which said air stream passes for removing particulate matter from said compressed air stream;

a pressure swing adsorber having a first molecular sieve bed through which said air stream can pass after passing through said HEPA-grade filter for removing chemical impurities, water and carbon dioxide vapor from said compressed air stream;

a first heat exchanger through which said air stream passes after passing through said first molecular sieve bed, said first heat exchanger cooling said air stream to lower the temperature of said air stream to a level where said air stream begins to partially condense;

a turboexpander through which a portion of said air stream passes after passing through said first heat exchanger, said turboexpander cooling said portion of said air stream to lower than −275° F. and directing said cooled portion of said air stream back through said first heat exchanger to cool said heat exchanger;

an first expansion valve through which another portion of said air stream passes after passing through said first heat exchanger, said first expansion valve lowering the pressure of said another portion of said air stream to a temperature at which a substantial portion of the oxygen in said another portion of said air stream condenses;

a nitrogen distillation column into which said another portion of said air stream passes after passing through said first expansion valve, said nitrogen column having a top and a bottom, said another portion of said air stream separating into condensate and vapor in said nitrogen column, said condensate falling toward the bottom of said nitrogen column and said vapor rising toward the top of said nitrogen column, wherein the portion of said vapor reaching said top of said nitrogen column contains over 95% pure nitrogen and said portion of said condensate reaching said bottom of said nitrogen column being oxygen rich;

a second expansion valve through which said oxygen rich condensate from said bottom of said nitrogen column passes, said expansion valve cooling said oxygen rich condensate lower than −300° F.;

an oxygen distillation column into which said condensate passes after passing through said second expansion valve, said oxygen column having a top and a bottom, said condensate separating into part vapor and part condensate in said oxygen column, said part coondensate falling toward the bottom of said oxygen column and said part vapor rising toward the top of said oxygen column, wherein said portion of said part condensate reaching said bottom of said oxygen column contains over 95% oxygen;

a condenser through which said portion of said part condensate reaching said bottom of said oxygen column passes and through which said portion of said vapor reaching said top of said nitrogen column passes, said portion of said part condensate reaching said bottom of said oxygen column cooling said portion of said vapor reaching said top of said nitrogen column causing said portion of said vapor reaching said top of said nitrogen column to condense; and

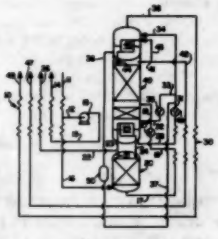
an insulating layer surrounding said first heat exchanger, said turboexpander, said nitrogen distillation column, said condenser and said oxygen distillation column.

4,957,524

AIR SEPARATION PROCESS WITH IMPROVED REBOILER LIQUID CLEANING CIRCUIT

Ravindra F. Pahade, Getzville; John H. Ziemer, Grand Island, and John K. Howell, Tonawanda, all of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.

Filed May 15, 1989, Ser. No. 351,807
Int. Cl.[5] F25J 3/02
U.S. Cl. 62—18 13 Claims



1. A method for cryogenic separation comprising:

(A) separating a feed comprising nitrogen, oxygen and higher boiling impurities, in a column having a top condenser-reboiler, into nitrogen-richer vapor and oxygen-enriched liquid containing higher boiling impurities;

(B) passing oxygen-enriched liquid from the column to the top condenser-reboiler;

(C) passing oxygen-enriched liquid from the top condenser-reboiler through an adsorbent bed, transferring higher boiling impurities from the liquid to the adsorbent, and returning resulting cleaned liquid to the top condenser-reboiler; and

(D) driving the liquid back to the top condenser-reboiler, at least in part, by combining the liquid with vapor to reduce the density of the stream passing back to the top condenser-reboiler.

4,957,525

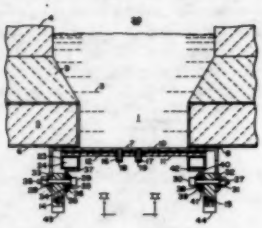
COMPOSITE BUSHING DESIGN

Dean J. Gaertner, New Kensington, and Eugene J. Palamara, Butler, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 20, 1989, Ser. No. 453,875
Int. Cl.[5] C03B 37/08
U.S. Cl. 65—1 15 Claims

1. A glass fiber forming bushing comprising a flat, planar

precious metal plate forming the bushing bottom and having an upper and lower surface, side walls attached to said bushing bottom forming a container for molten glass, a plurality of holes in said precious metal plate, a fiber forming tip depending from each said hole and extending below the lower surface of said precious metal plate, a non-electrically conductive coating covering the lower surface of the said precious metal plate, a second metal plate essentially coextensive with said precious metal plate and providing mechanical support thereto and also provided with a plurality of holes therein, said second plate being positioned against the said precious metal plate so that the tips depending from the precious metal plate pass through



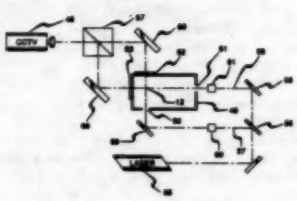
the holes in said second plate, said second metal plate having an upper and a lower surface, the upper surface of said second plate being covered with a non-electrically conductive coating which is in contact with the coating on the precious metal plate lower surface, both non-electrically conducting surface forming an insulating zone between the precious metal plate and the second metal plate, an electrically insulating air gap being provided between walls of the holes in the second metal plate and the outside of each of said tips passing through said holes to thereby isolate them electrically from said second plate, means to provide electric current to the said precious metal plate and means to pass molten glass through said glass fiber forming bushing.

4,957,526

OPTICAL FIBER COATING CONTROL PROCESS

Ralph E. Frazee, Jr., Bricktown, and David H. Smithgall, Sr., East Windsor, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 2, 1989, Ser. No. 381,375
Int. Cl.[5] C03B *37/07*; C03C *25/02*
U.S. Cl. 65—3.11 **21 Claims**



1. A method for making optical fibers comprising the steps of: drawing a light-guiding fiber from a heated body of a plastic material , coating the fiber, directing two light beams at different angles at the coated fiber, detecting forward-scattered light from the two light beams, analyzing the detected light to generate information, and using the information to modify the coating, characterized in that:

the forward-scattered light is projected through two translucent screens; and

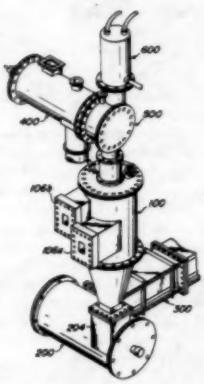
light transmitted through the two screens is directed to a light combining device where it is combined for transmission to a single detector, wherein said information is used to control the concentricity of a coating on the fiber and/or the thickness of a coating on the fiber.

4,957,527

METHOD AND APPARATUS FOR HEAT PROCESSING GLASS BATCH MATERIALS

James G. Hnat, 3774 Lewis Rd., Collegeville, Pa. 19426

Filed Mar. 8, 1989, Ser. No. 320,737
Int. Cl.[5] C03B *3/02*
U.S. Cl. 65—19 **52 Claims**



1. An apparatus for producing glass from glass batch materials, in the presence of a fuel and oxidant, said apparatus comprising:

cyclone glass melt reactor means for forming a liquid glass melt;

combustion preheater means for receiving said glass batch materials, fuel and oxidant and combusting said fuel and oxidant therein and heating said glass bat h materials to a temperature at least equal to the melt temperature of said glass batch materials, said combustion preheater means having an outlet connected to said cyclone glass melt reactor means; and

inlet means for injecting said oxidant into said combustion preheater means and creating a counter rotating well-stirred region within said combustion preheater means.

23. A method of treating materials for delivery to a cyclone melter having an inlet and an outlet, said method comprising the steps of:

connecting a suspension-type cylindrical combustion preheater to the inlet of said melter, said preheater having a vertically oriented longitudinal axis and an upper and a lower end,

introducing a first material into said preheater;

introducing a fuel into said preheater; and

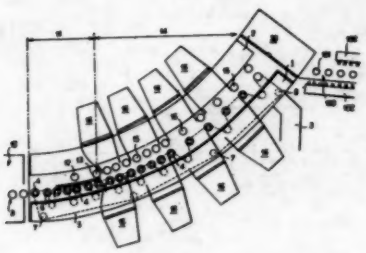
introducing a preheated oxidant into said preheater so as to create a counter rotating, turbulent mixture of said fuel, said oxidant and said first material within the upper end of said preheater, whereby a well-stirred region of said oxidant, said first material and said fuel is created in the upper end of said preheater.

4,957,528

METHOD AND APPARATUS FOR BENDING AND TEMPERING GLASS PLATES

Bernard Letemps, Thourotte; Jacques Leclercq, Roisel, and Philippe Dereims, Compiegne, all of France, assignors to Saint-Gobain Vitrage, Courbevoie, France

Filed Jun. 7, 1989, Ser. No. 362,654
Claims priority, application France, Jun. 7, 1988, 88 07532
Int. Cl.[5] C03B *23/033, 27/04*
U.S. Cl. 65—104 8 Claims



1. A bending and hardening installation comprising:

a shaping bed having means for supporting and shaping a heated glass plate moving in a conveying direction along said shaping bed, said shaping bed being curved in said conveying direction;

an evacuation conveyor positioned downstream of said shaping bed in the conveying direction, and having a conveying direction non-coplanar with the conveying direction of said shaping bed at a downstream end of said shaping bed; and

tilting means for tilting a glass plate exiting the downstream end of said shaping bed from said conveying direction of the downstream end of said shaping bed to said conveyor direction of said evacuation conveyor, comprising:

a rotatable glass plate support element having an axis aligned with, and immediately downstream of, said means for supporting and shaping,

at least one holding means spaced from the axis of said support element, said holding means being rotatable about an axis extending parallel to the axis of said support element, said axis of said holding means being rotatable as a drum about the axis of said support element and independent of rotation of said support element, said holding means being spaced from said support element such that a glass plate exiting the downstream end of said shaping bed is held between said glass plate support element and said holding means when said holding means is at a receiving position wherein the space between said support element and said holding means is aligned with the glass plate exiting said downstream end of said shaping bed, whereby the weight of a glass plate rotates the drum in a rotating direction to a drive position in which the glass plate is tilted to the conveying direction of said evacuation conveyor;

means for periodically driving said drum in said rotating direction from said drive position to a new receiving position; and

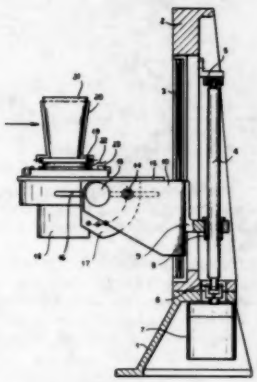
blowing means for blowing cooling air on a glass plate held by said tilting means.

4,957,529

METHOD OF DECORATING GLASS AND CERAMIC ARTICLES

Dimiter A. Dimitrov; Mincho S. Dakov, both of Plovdiv; Dancho T. Tonchev, Sofia; Hristo A. Kalafirov, Plovdiv; Todor S. Botev, Plovdiv; Krassimir E. Shterev, Plovdiv; Vladimir S. Kojuharov; Yordan I. Dimitrov, both of Sofia, and Dimiter V. Tzvetkov, Varna, all of Bulgaria, assignors to PU "Paisii Hilendarski", Plovdiv, Bulgaria

Filed Apr. 14, 1989, Ser. No. 338,959
Claims priority, application Bulgaria, May 27, 1988, 84291
Int. Cl.[5] C03B *23/00, 23/26;* B44C *1/22*
U.S. Cl. 65—112 1 Claim



1. A method of decorating a glass or ceramic article which comprises the steps of:

(a) juxtaposing a surface of a glass or ceramic article to be decorated with a mask consisting of a polished metal foil of a thickness of 0.1 to 0.9 mm and having photolithographically reproduced therein a throughgoing image across which a raster extends with a resolution of 5 to 150 lines/cm;

(b) directing a repetitively-pulsed cross discharge atmospheric pressure CO_2 laser beam with a pulse energy of 1 to 5 J, a power density of 1×10^6W/cm^2 to 6×10^7W/cm^2, a pulse duration of 50 to 100 ns and an average power of 1 to 1000 W substantially perpendicular to said mask and said surface through said mask against said surface over a single shot area of 0.5 to 2 cm^2 to evaporatively decorate said surface; and

(c) repetitively exposing said surface to said laser beam in step (b) while moving said article together with said mask to effect overlapping of exposed regions of 5 to 80% to impart contrast to the decorated region.

4,957,530

APPARATUS FOR PLUNGER REPLACEMENT IN A MOLDING MACHINE WHILE THE MOLDING MACHINE IS IN OPERATION

Sigezo Fujii; Tsuneya Uesugi, both of Nagahama, and Kiyoshi Sakamoto, Siga, all of Japan, assignors to Nippon Electric Glass Co., Ltd., Otsu, Japan

Filed May 5, 1989, Ser. No. 347,644
Claims priority, application Japan, May 11, 1988, 63-115572
Int. Cl.[5] C03B *11/02*
U.S. Cl. 65—172 3 Claims

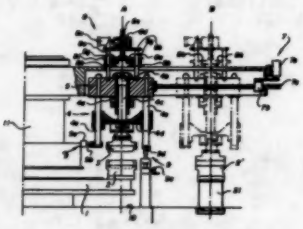
1. A molding machine of a type having a plurality of molding tools arranged in equally spaced relation in a peripheral area of a rotary table adapted to be rotated intermittently so that while the intermittently rotating table is not in rotation,

glass products are press moided by plungers, the molding machine comprising:

a plurality of ram devices, each said ram device having a plunger removably mounted thereto;

a plurality of movable yokes each for individually supporting one of said ram devices;

a plurality of fixed yokes provided on the rotary table and each for individually reciprocably supporting one of the movable yokes, each said fixed yoke having a reciprocating means for moving said supported movable yoke and ram device between a pressing position above the molding tool and a plunger replacing position a location spaced therefrom;



a plurality of locking means each for individually lockng the supported movable yoke to the fixed yoke at the pressing position and the plunger replacing position; and

a plurality of positioning means each for individually positioning the supported ram device at the pressing position.

4,957,531

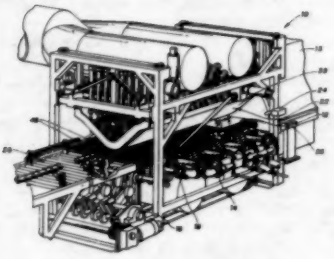
APPARATUS FOR HEATING BENDING AND QUENCHING GLASS SHEETS

Harold A. McMaster, Woodville, Ohio, and Ben M. Balestra, Temperance, Mich., assignors to Glasstech, Inc., Perrysburg, Ohio

Continuation-in-part of Ser. No. 249,718, Sep. 27, 1988, Pat. No. 4,883,527, which is a continuation of Ser. No. 83,675, Aug. 7, 1987, Pat. No. 4,822,398. This application Jun. 19, 1989, Ser. No. 367,849

Int. Cl.[5] C03B *23/03*

U.S. Cl. 65—273 **20 Claims**



1. A glass heating, bending and tempering apparatus for receiving a heated glass sheet, the apparatus comprising: a first platen; said first platen being deformable and including an actuator for deforming said platen from a planar shape to a bent shape; said first platen including a first heating means and quench openings throughout the extent thereof; said first heating means and said quench openings of the first platen being movable therewith during the deformation of the platen; said first heating means providing heat in close proximity to the heated glass sheet during the bending to maintain an optimal glass bending temperature; and a second platen having quench openings throughout the extent thereof and opposing the first platen in spaced relationship with the glass sheet therebetween; quenching gas being supplied to the quench openings of both platens and thereby to both sides of the glass sheet to temper the bent glass sheet between the platens.

4,957,532

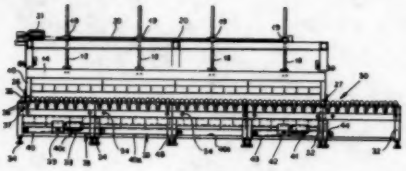
GLASS-TREATING FURNACE WITH ROLLER CONVEYOR

David Jacobson, Pomona, N.Y.; Robert LeGrand, Fairlawn, N.J., and Keith Gardener, Spring Valley, N.Y., assignors to Casso-Solar Corporation, Pomona, N.Y.

Filed Jun. 20, 1989, Ser. No. 369,693

Int. Cl.[5] C03B *35/18*

U.S. Cl. 65—273 **24 Claims**



1. A furnace for the heat treating of glass, comprising:

a housing defining an elongated furnace chamber having opposite longitudinal sides and having an inlet end and an outlet end;

a roller conveyor extending between said inlet end and said outlet end, said roller conveyor comprising:

a respective row of stub rollers spaced apart along each longitudinal side of said chamber, said stub rollers having respective axes,

respective conveyor rollers spanning said rows of stub rollers and respectively cradled in pairs of said stub rollers at opposite ends of each of said conveyor rollers,

idler pulleys alternating with idler-pulley-free spaces between each two successive stub rollers along one of said longitudinal sides of said chamber, said idler pulleys lying in a further row below said row of stub rollers along said one of said longitudinal sides, and

an endless drive element for driving at least a multiplicity of said conveyor rollers over at least a section of the length of said chamber, said rive element overshooting the axes of each of said two successive stub rollers of said section in a respective single loop across each of said idler-pulley-free spaces and undershooting each of said pulleys in a respective loop between each of said two successive stub rollers having an idler-pulley between them, and being drivingly coupled to each of said two successive stub rollers having an idler-pulley-free space between them;

means for driving said element to advance a glass workpiece through said chamber; and

an array of infrared heaters mounted in said housing above said conveyor to heat said workpiece on said conveyor rollers.

4,957,533

N-PHENYLALKYLBENZAMIDE FUNGICIDES

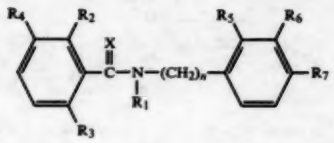
Wendell R. Arnold, Carmel, and James D. Davenport, Indianapolis, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 112,657, Oct. 26, 1987, abandoned. This application Sep. 1, 1988, Ser. No. 239,355

Int. Cl.[5] A01N *37/18, 9/20*; C07C *103/76*

U.S. Cl. 71—3 **24 Claims**

1. A compound of the formula (I):



(I)

wherein:
X=O, S, or NOH;
R^1 is H or CH_3;
n=1, 2, or 3;
R^2, R^3, and R^4 are as defined in one of the following paragraphs
(a) R^2 and R^3 are independently Cl or Br, and R^4 is H;
(b) R^2, R^3 and R^4 are independently Cl or Br;
(c) R^2 is F, R^3 is Cl, and R^4 is H; or
(d) R^2 and R^3 are CH_3 or C_2H_5, and R^4 is H; and
one or R^6 and R^7 is CF_3, R^5 and the other and R^6 and R^7 is H.

4,957,534

NOVEL ORGANIC FERTILIZER AND PRODUCTION THEREOF

Dawn E. Francis, 1347 Nicolet, Detroit, Mich. 48207

Continuation-in-part of Ser. No. 947,741, Dec. 30, 1986, abandoned. This application Aug. 10, 1988, Ser. No. 230,780
Int. Cl.[5] C05F *11/00*
U.S. Cl. 71—23 **5 Claims**

1. A novel biodegradable organic fertilizer consisting essentially of (A) dead leaves dried and finely ground, (B) skim milk which is dried and powdered and essentially fat free, and (C) water in an amount to give a kneadable mass, the composition being dried and granular.

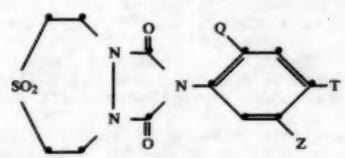
4,957,535

NOVEL ANNULARLY-LINKED TRIAZOLE COMPOUNDS

Beat Böhner, Binningen, Switzerland; Georg Pissiotasa, Lörrach, Fed. Rep. of Germany, and Hans Moser, Magden, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 886,501, Jul. 17, 1986, Pat. No. 4,789,394. This application Sep. 29, 1988, Ser. No. 250,888
Int. Cl.[5] A01N *43/90*; C07D *513/04*
U.S. Cl. 71—76 **11 Claims**

1. An annularly-linked triazole compound of the formula I



(I)

wherein
Q is fluorine,
T is chlorine or bromine,
Z is a radical —XR,
X is oxygen or sulfur,
R is a C_2–C_6-alkenyl or C_3–C_6-alkynyl radical, which is unsubstituted or substituted by halogen, or is a radical —A—$COXR_1$, in which
A is a C_1–C_4-alkylene bridge and
R_1 is C_1–C_4-alkyl.

9. A herbicidal and plant-growth regulating composition which contains as active ingredient an effective amount of an annularly-linked triazole compound according to claim 1, together with inert carriers and/or other additives.

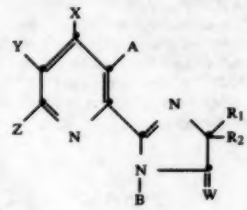
4,957,536

METHOD FOR INCREASING AXILLARY BRANCHING, TILLERING, FLOWERING AND YIELD OF AGRONOMIC AND HORTICULTURAL CROPS WITH CERTAIN 2-(2-IMIDAZOLIN-2-YL)-PYRIDINES AND QUINOLINES

Philip L. Orwick, Yardley, Pa., and Andrew R. Templeton, West Trenton, N.J., assignors to American Cyanamid Company, Stamford, Conn.

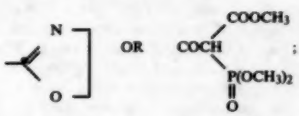
Continuation of Ser. No. 910,319, Sep. 22, 1986, abandoned, which is a continuation of Ser. No. 635,787, Jul. 30, 1984, abandoned, which is a continuation-in-part of Ser. No. 490,548, May 6, 1983, abandoned, which is a continuation-in-part of Ser. No. 255,012, Apr. 17, 1981, abandoned, which is a continuation-in-part of Ser. No. 155,866, Jun. 2, 1980, abandoned. This application Sep. 22, 1988, Ser. No. 249,243
Int. Cl.[5] A01N *43/18, 43/64, 57/00, 57/10*
U.S. Cl. 71—92 **9 Claims**

1. A method to increase axillary branching, tillering, flowering and yield of agronomic crops and accelerate maturation of cereal crops comprising: applying to said crops plants or to soil containing the seeds other propagating organs of said plants, an effective amount of a compound having the structure:

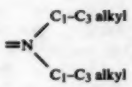


(I)

wherein
R_1 is C_1–C_4alkyl;
R_2 is C_{1-C4} alkyl or C_3–C_6 cycloalkyl; and when R_1 and R_2 are taken together they may represent C_3–C_6 cycloalkyl optionally substituted with methyl;
A is $COOR_3$, $CONHR_6$, CHO, CH_2OH, $COCH_3$, COC_6H_5, CN, CH_3, CH=NOH, CH_2COOH, CONHOH, CH_2CH_2COOH, CHR_8OH,



R_3 is hydrogen,



C_1–C_{12} alkyl optionally substituted with one of the following groups: C_1–C_3 alkoxy, halogen, hydroxyl, C_3–C_6 cycloalkyl, benzyloxy, furyl, phenyl, halophenyl, loweralkylphenyl, loweralkoxyphenyl, nitrophenyl, carboxyl, loweralkoxycarbonyl, cyano or triloweralkylammonium;
C_3–C_{12} alkenyl optionally substituted with one of the following groups: C_1–C_3 alkoxy, phenyl, halogen or

loweralkoxycarbonyl or with two C_1–C_3 alkoxy groups or two halogen groups;

C_3–C_6 cycloalkyl optionally substituted with one or two C_1–C_3 alkyl groups;

C_3–C_{10} alkynyl optionally substituted with one or two C_1–C_3 alkyl groups; or,

A cation;

R_6 is hydrogen, hydroxyl, C_3-alkenyl, C_3-alkynyl or C_1–C_4 alkyl optionally substituted with one hydroxyl or one chlorine group;

B is H, COR_4 or SO_2R_5, provided that when B is COR_4 or SO_2R_5; A is $COOR_3$ in which R_3 is other than H, or a salt-forming cation, CH_3 or CN; W is O and Y and Z are not alkylamino, hydroxyl, or hydroxyloweralkyl;

R_4 is C_1–C_{11} alkyl, chloromethyl or phenyl optionally substituted with one chloro, one nitro or one methoxy group:

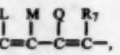
R_5 is C_1–C_4 alkyl or phenyl optionally substituted with one methyl group;

W is O or S;

R_3 is C_1–C_4-alkyl or phenyl;

X is hydrogen, halogen, hydroxyl or methyl, with the proviso that when Y and Z are taken together to form a ring and YZ is represented by the structure: $-(CH_2)_n-$, where n is 3 or 4, X is hydrogen;

Y and Z each represent members selected from the group consisting of hydrogen, halogen, C_1–C_6 alkyl, hydroxyloweralkyl, C_1–C_6 alkoxy, C_1–C_4 alkylthio, phenoxy, C_1–C_4-haloalkyl, nitro, cyano, C_1–C_4 alkylamino, diloweralkylamino or C_1–C_4 alkylsulfonyl group, or phenyl optionally substituted with one C_1–C_4 alkyl, C_1–C_4 alkoxy or halogen; and, when taken together, Y and Z may form a ring in which YZ are represented by the structure: $-(CH_2)_n-$, where n is an integer selected from 3 and 4, provided that X is hydrogen;



or $-C\equiv C-C\equiv C-$,

where L, M, Q and R_7 each represent members selected from the group consisting of hydrogen, halogen, C_1C_4 alkyl, C_1C_4 alkoxy, C_1–C_4 alkylthio, C_1–C_4 alkylsulfonyl, C_1–C_4 haloalkyl, NO_2, CN, phenyl, phenoxy, amino, C_1–C_4 alkylamino, diloweralkylamino, chlorophenyl, methylphenyl, or phenoxy substituted with one Cl, CF_3, NO_2 or CH_3 group, with the proviso that only one of L, M, Q or R_7, may represent a substituent other than hydrogen, halogen, C_1–C_4 alkyl or C_1–C_4-alkoxy.

and when W is O and A is CN, CH_3 or $COOR_3$, provided that R_3 cannot be unsaturated alkyl and Y and Z cannot be alkylamino, dialkylamino or alkylthio, and the N-oxides thereof, and when R_1 and R_2 are not the same, the optical isomers thereof, and, except when R_3 is a salt-forming cation, the acid addition salts thereof.

4,957,537

METHOD FOR REGULATING PLANT GROWTH

Tsutomu Teraji, Osaka; Atsushi Yamamura, Ibaraki; Yasuo Kamuro, Tsukuba; Koichi Hirai, Hanyu, and Seiichi Fujii, Oomiya, all of Japan, assignors to Fujisawa Pharmaceutical Company, Ltd, Osaka and Nissan Chemical Industries, Ltd., Tokyo, both of, Japan

Filed Mar. 22, 1988, Ser. No. 171,799

Claims priority, application Japan, Mar. 24, 1987, 62-69370

Int. Cl.[5] A01N *37/32*

U.S. Cl. 71—95 **12 Claims**

1. A method for regulating plant growth which is characterized by treating a plant with an effective, regulating amount of a composition containing the compound:

wherein R^1 is halophenyl and R^2 is phenylthio, in admixture with a vehicle.

4,957,538

CERTAIN 2-(2',3',4'-TRISUBSTITUTED BENZOYL)-1,3-CYCLOOHEXANEDIONES

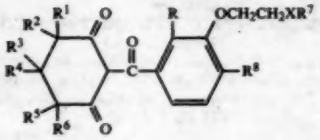
William J. Michaely, El Cerrito, Calif., assignor to ICI Americas Inc., Wilmington, Del.

Filed Nov. 18, 1988, Ser. No. 273,371

Int. Cl.[5] A01N *31/14*; C07C *323/65*

U.S. Cl. 71—98 **24 Claims**

9. The method of controlling undesirable vegetation comprising applying to the area where control is desired, an herbicidally effective amount of a compound having the structural formula



wherein

X is oxygen or sulfur;

R is chlorine or bromine;

R^1 is hydrogen or C_1–C_4 alkyl;

R^2 is hydrogen or C_1–C_4 alkyl;

R^3 is hydrogen or C_1–C_4 alkyl;

R^4 hydroxy, hydrogen or c_1–C_4 alkyl; or

R^3 and R^4 together are carbonyl (=O) with the proviso that R^1, R^2, R^5 and R^6 are all C_1–c_4 alkyl;

R^5 is hydrogen or C_1–C_4 alkyl;

R^6 is hydrogen, C_1–C_4 alkyl, C_1–C_4 alkylthio or C_1–C_4 alkylsulfonyl;

R^7 is methyl or ethyl; and

R^8 is (1) halogen; (2) nitro; or (3) R^bSO_n- wherein n is the integer 0 or 2; and R^b is (a) C_1–C_3 alkyl; and its salts.

4,957,539

TRIAZOLES INCLUDING ALKYNYL SUBSTITUTION USEFUL AS FUNGICIDES OR AS PLANT GROWTH REGULATING AGENTS

Paul A. Worthington, Maidenhead; Patrick J. Crowley, Crowthorne, and Michael B. Gravestock, Stockport, all of England, assignors to Imperial Chemical Industries PLC, London, England

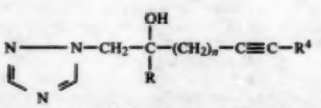
Continuation of Ser. No. 503,545, Jun. 13, 1983, abandoned. This application Dec. 28, 1988, Ser. No. 291,236

Claims priority, application United Kingdom, Jun. 14, 1982, 8217191; Jan. 21, 1983, 8301677

Int. Cl.[5] A01N *43/653*; C07D *249/08*

U.S. Cl. 71—92 **5 Claims**

1. A triazole derivative having the formula:



and stereoisomers thereof wherein R and R^4, which may be the

same or different, are a straight or branched chain alkyl group containing from 1 to 6 carbon atoms and n is 1, 2, 3 or 4.

4,957,540

CERTAIN SUBSTITUTED 3-(SUBSTITUTED OXY)-2-BENZOYL-CYCLOHEX-2-ENONES

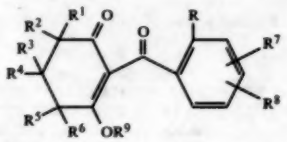
Christopher G. Knudsen, Berkeley, and William J. Michaely, Richmond, both of Calif., assignors to ICI Americas Inc., Wilmington, Del.

Division of Ser. No. 871,989, Jun. 9, 1986, Pat. No. 4,918,236. This application Dec. 19, 1989, Ser. No. 453,432

Int. Cl.[5] A01N *35/00*

U.S. Cl. 71—123 **12 Claims**

1. The method of controlling undesirable vegetation comprising applying to the area where control is desired, an herbicidally effective amount of a compound having the formula



wherein

R is halogen, C_1–C_2 alkyl, C_1–C_2 alkoxy, nitro; cyano; C_1–C_2 haloalkyl, or R^aSO_m— wherein m is 0 or 2 and R^a is C_1–C_2 alkyl;

R^1 is hydrogen or C_1–C_4 alkyl;

R^2 is hydrogen or C_1–C_4 alkyl; or

R^1 and R^2 together are alkylene having 2 to 5 carbon atoms;

R^3 is hydrogen or C_1–C_4 alkyl;

R^4 is hydrogen or C_1–C_4 alkyl;or

R^3 and R^4 together are oxo;

R^5 is hydrogen or C_1–C_4 alkyl;

R^6 is hydrogen or C_1–C_4 alkyl; or

R^5 and R^6 together are alkylene having 2 to 5 carbon atoms;

R^7 and R^8 independently are (1) hydrogen; (2) halogen; (3) C_1–C_4 alkyl; (4) C_1–C_4 alkoxy; (5) trifluoromethoxy; (6) cyano; (7) nitro; (8) C_1–C_4 haloalkyl; (9) R^bSO_n— wherein n is the integer 0, 1 or 2; and R^b is (a) C_1–C_4 alkl; (b) C_1–C_4 alkyl substituted with halogen or cyano; (c) phenyl; or (d) benzyl; (10) —NR^cR^d wherein R^c and R^d independently are hydrogen or C_1–C_4 alkl; (11) $R^eC(O)$— wherein R^e is C_1–C_4 alkyl or C_1–C_4 alkoxy; (12) $SO_2NR^cR^d$ wherein R^c and R^d are as defined; or (13) —$N(R^c)C(O)R^d$ wherein R^c and R^d are as defined; and

R^9 is (a) C_1–C_6 alkyl; (b) C_4–C_6 cycloalkyl; (c) substituted C_1–C_6 alkyl; (d) phenyl—SO_2—; (e) substituted phenyl—SO_2—; (f) C_1–C_6-alkyl—SO_2—, optionally substituted; (g) C_1–C_6 alkyl-C(O)—, optionally substituted; (h) phenyl—C(O)—, optionally substituted; (i) benzyl; or (h) C_3–C_6 alkenyl.

4,957,541

CAPACITOR GRADE TANTALUM POWDER

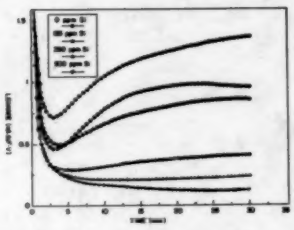
Terrance B. Tripp, Westboro, and Richard W. Hildreth, Hollliston, both of Mass., assignors to NRC, Inc., Newton, Mass.

Filed Nov. 1, 1988, Ser. No. 265,498

Int. Cl.[5] B22F *9/24*

U.S. Cl. 75—245 **7 Claims**

1. Improved capacitor grade tantalum powder which can be anodically formed to a low leakage product at formation temperatures selected substantially throughout the range 40°–90° C., comprising a content of silicon and phosphorous in combined concentration effecting a specific D.C. leakage (L/CV) of such powder of less than 0.5 nanoamperes per microfarad-volt and high specific capacitance (CV/g) in excess of 15,000



cv/gm in anodized pellets as made therefrom and sintered at 1,400° C. or higher.

4,957,542

PROCESS FOR TREATING LIQUID STEELS BY INJECTING GAS THROUGH THE LADLE BOTTOM

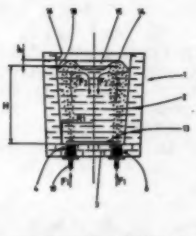
Philippe Barthelemy, Sevres, and Christian Naturel, Brignais, both of France, assignors to Vallourec Industries, Boulogne-Billancourt and Savoie Refractaires, Venissieux, both of, France

Filed Jun. 15, 1989, Ser. No. 366,501

Claims priority, application France, Jun. 17, 1988, 88 08479

Int. Cl.[5] C21C *7/00*

U.S. Cl. 75—10.39 **20 Claims**



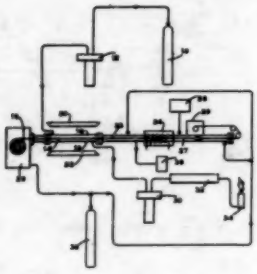
1. A process for treatment in a ladle of a liquid steel by at least one gas injected through the ladle bottom, in which the gas-metal exchange surfaces are multiplied with retention of the individuality of each small gas bubble and their low rate of rise, and with prevention of bubble coalescence, comprising the step of:

injecting said gas through injection elements, the total area of said elements being between S/10 and S/30, where S is the area of the bottom of the ladle, wherein said injection elements are disposed at a distance from the center of the bottom of the ladle which is at least equal to half the radius of the bottom of the ladle and spaced from the internal wall of the ladle by a distance which is at least equal to 1/10th of said radius and wherein the mean unitary gas flow rate per cm^2 of area of the injection elements is between 0.1 and 0.8 1/minute, wherein said elements are pores whose unitary cross section is less than 0.8 mm^2, the total area being between 15 and 40 mm^2 per dm^2 of injection elements, or said elements are slots whose thickness is less than 0.4 mm, the total area being between 45 and 105 mm^2 per dm^2 of area of injection elements.

4,957,543
METHOD OF FORMING NICKEL FOAM

Juraj Babjak; Victor A. Ettel, and Vladimir Paserin, all of Mississauga, Canada, assignors to Inco Limited, Toronto, Canada

Filed Jun. 16, 1989, Ser. No. 368,193
Int. Cl.[5] C22B 5/20; B22F 1/00
U.S. Cl. 148—13 **9 Claims**



1. A method of forming a nickel foam comprising:
placing an open-cell thermally decomposable foam structure in an atmosphere containing nickel carbonyl gas,
heating said foam structure to a temperature at which said nickel carbonyl gas decomposes,
decomposing nickel from said nickel carbonyl gas on said foam structure to form a nickel plated foam structure, and
sintering said nickel plated foam structure to thermally decompose and remove said foam structure from said nickel plated foam structure leaving an open-cell nickel network of interconnected nickel wires to form said nickel foam.

4,957,544
PARTIAL OXIDATION PROCESS INCLUDING THE CONCENTRATION OF VANADIUM AND NICKEL IN SEPARATE SLAG PHASES

Mitri S. Najjar, Wappingers Falls, N.Y., assignor to Texaco, Inc., White Plains, N.Y.

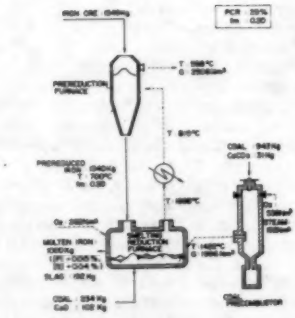
Filed Sep. 1, 1989, Ser. No. 401,705
Int. Cl.[5] C21B 3/04
U.S. Cl. 75—500 **12 Claims**

1. A partial oxidation process for producing synthesis gas, reducing gas, or fuel gas and two separate by-product slag materials which are respectively rich in vanadium and nickel comprising:
(1) reacting an ash-containing fuel feedstock comprising petroleum coke and/or heavy liquid hydrocarbonaceous fuel, wherein said ash comprises compounds of V, Ni and Si, by partial oxidation in a free-flow unobstructed vertical gas generator in the presence of a free-oxygen containing gas, temperature moderator, and an iron-containing additive in the amount of about one to ten parts by weight of additive to one part by weight of the ash in said fuel feedstock and at least 5 parts by weight of iron for each part by weight of vanadium, at a temperature in the range of about 2100° F. to 3000° F. in a reducing atmosphere, a pressure in the range of about 1 to 200 atmospheres, an O/C (atomic ratio) in the range of about 0.3 to 1.5, and a H_2O/fuel feedstock weight ratio in the range of about 0.1 to 5.0 to produce a hot raw effluent stream of synthesis gas, reducing gas, or fuel gas with entrained molten slag, and carbon-containing particulate material;
(2) cooling the hot raw gas stream from (1), and separating by conventional methods coarse slag having a particle size of at least 40 mesh from fine slag and carbon-containing particulate materials having a particle size of less than 40 mesh;
(3) heating the coarse slag from (2) while in contact with reducing gas in a thermal reduction zone wherein an equilibrium oxygen concentration is provided in the gas phase with a partial pressure of oxygen in the range of about 8.4×10^{-20} to 1.1×10^{-10} atmosphere and at a temperature in the range of about 1900° F. to 2600° F. and above the melting point of said slag to produce a molten bath of slag comprising the following immiscible phases in wt. %:
(a) a dense metal phase in the amount of about 0.1 to 5.0 which precipitates to the bottom comprising a nickel-iron alloy containing about 5 to 60 wt. % of nickel;
(b) a sulfur encapsulated slag phase in the amount of about 5.0 to 85 that floats on said phase (a) comprising iron silicate;
(c) the remainder comprising vanadium-rich silicate and spinel phases comprising at least 3 wt. % vanadium which floats on said phase (b); and
(4) separating said phases (a), (b) and (c) from each other.

4,957,545
SMELTING REDUCTION PROCESS USING REDUCING GAS GENERATED IN PRECOMBUSTOR

Akihide Hikosaka, Mishima; Tsuyoshi Mimura, Kobe; Tomio Suzuki, Kobe; Takeo Yoshigae, Kobe, and Shuzo Itoh, Kobe, all of Japan, assignors to Kabushiki kaisha Kobe Seiko Shoe, Kobe, Japan

Filed Jan. 27, 1989, Ser. No. 302,612
Claims priority, application Japan, Jan. 29, 1988, 63-20168
Int. Cl.[5] C21B 11/08
U.S. Cl. 75—501 **8 Claims**



1. A smelting reduction process with a smelting reduction furnace and a precombustor, the precombustor having an upper portion and a lower portion thereon, for smelting and reducing an iron oxide material by introducing the said iron oxide material into a smelting reduction furnace together with a solid carbonaceous material, a fluxing agent and an oxygen-containing gas, said process comprising the steps of:
supplying primary air to the upper portion of said precombustor as a swirling flow in an amount of 0.4 to 9.0 of the stoichiometric air amount;
injecting pulverized carbonaceous material into the precombustor from the upper portion of said precombustor to generate high temperature reducing gas and combustion residue ash or slag;
separating the resulting reducing gas from the combustion residue ash or slag of said solid carbonaceous material at the lower portion of the precombustor; and
introducing said reducing gas into said smelting reduction furnace at a temperature of at least 1410° C. to effect secondary combustion while introducing a separate sup-

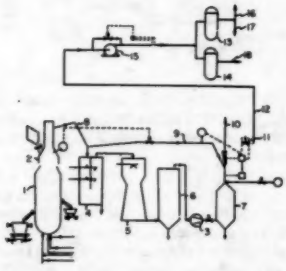
ply of oxygen-containing gas for smelting and reducing said iron material.

4,957,546

DIRECT STEELMAKING PROCESS FROM 100% SOLID CHARGE OF MULTIPLE REDUCING AND OXIDIZING ALTERNATING PERIODS

Arturo Lazcano-Navarro, Saltillo, Mexico, assignor to Instituto Mexicano de Investigaciones Siderurgicas, Saltillo, Mexico

Filed May 10, 1989, Ser. No. 349,650
Int. Cl.[5] C21B 11/00
U.S. Cl. 75—529 8 Claims



1. A semicontinuous process to produce steel or iron by conducting repetitive refining operations on a charge in a metallurgical vessel, said process comprising:

(a) providing an initial quantity of molten metal in a metallurgical vessel;

(b) conducting a reducing period on the molten metal contained in the metallurgical vessel, the reducing period including the simultaneous bottom injection into the vessel of carbonaceous material and oxygen, the carbonaceous material having a carbon (kg) to oxygen (Nm3) ratio between 1 and 2.5, so that the carbon content in the molten metal increases to between 2% to 4% by weight to provide a positive variation of carbon in the melt with respect to time ($d(\%C)/dt > O$) and thereby increasing latent heat of the melt and superheating of the melt;

(c) conducting an oxidizing period on the molten metal, the oxidizing period including charging a quantity of solid metallic charge and fluxes into the vessel and melting the metallic charge by performing exclusively oxygen injection to provide a negative variation of carbon content in the melt with respect to time ($d\%(\%C)/dt < O$) to about 1% by weight to produce a mass of metal and slag wherein one reducing period and one oxidizing period constitute an operating cycle;

(d) continuing alternating periods of reduction and oxidation, including tapping slag produced after at least 2 operating cycles and immediately after an oxidizing period, the tapping conducted through a slag notch in the vessel, the slag notch being offset by 90 from a vessel trunnion axis; and

(e) after a mass of metal is obtained, tapping the molten metal through a steel notch in the vessel, the steel notch being offset by 180 from the slag notch and at such a height that after metal tapping a metallic ignition heel remains within the metallurgical vessel in order to initiate a succeeding series of operating cycles.

4,957,547

PROCESS FOR CONTINUOUSLY MELTING OF STEEL

Ludwig von Bogdandy, Linz; Gerhard Mitter, Traun; Otto Köller; Luzian Pochmarski, both of Leoben; Christian Jaquemar, Puchenau, all of Austria, and Hans-Jürgen Langhammer, Platjenwerbe, Fed. Rep. of Germany, assignors to Voest-Alpine Stahl Donawitz Gesellschaft mbH, Leoben-Donawitz, Austria

Filed Oct. 12, 1988, Ser. No. 256,410
Claims priority, application Austria, Oct. 13, 1987, 2709/87; Dec. 10, 1987, 3247/87
Int. Cl.[5] C21B 5/36
U.S. Cl. 75—567 14 Claims

1. A process for continuously producing molten steel, comprising:

(a) adding to a converter,

(i) at least one largely already reduced iron-containing material selected from the group consisting of scrap iron, pig iron, iron pellets and iron sponge, and

(ii) at least one Fe—MgO—SiO_2 system flux;

(b) introducing oxygen and a carbon-containing fuel into the charge comprising the iron-containing material and flux in the converter, thereby producing a melt comprising molten metal in contact with a metallurgical slag having the following composition:

20–77.2% FeO
10–30% SiO_2
2–15% Al_2O_2
5–20% Mgo
0.13–6.45% MnO
1–10% CaO
0.1–5% Cr_2O_3
trace P+S;

(c) pouring the resulting melt into a ladle;

(d) conducting metallurgical steps on the melt in the ladle and thereby changing said molten metal into molten steel; and

(e) pouring the resulting molten steel from the ladle.

4,957,548

CERMET ALLOY

Nobuhiko Shima, Narita; Hisaaki Ida, Kumagaya, and Yusuke Iyori, Fukaya, all of Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan

Filed Jul. 22, 1988, Ser. No. 222,780
Claims priority, application Japan, Jul. 23, 1987, 62-183880
Int. Cl.[5] C22C 29/04
U.S. Cl. 75—238 4 Claims

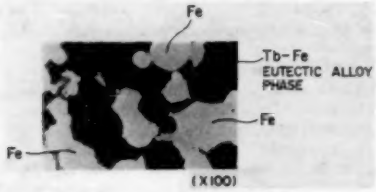
1. A cermet alloy which consists essentially of 50–95% by weight of a hard phase comprising a composite carbo-nitride of tungsten and titanium and one or more elements selected from the group consisting of Groups IVa, Va and VIa elements of the Periodic Table and the balance being a binding phase of an Fe family element or elements and inevitable impurities; said hard phase containing 50% by volume or less of TiN particles or TiCN particles having $N \geqq C$ and forming no rim-and-core structure, and said composite carbo-nitride having a rim-and-core structure which comprises a core portion of the composite carbo-nitride poor in titanium and nitrogen, surrounded thereon by a rim portion of the composite carbo-nitride rich in titanium and nitrogen.

4,957,549

RARE EARTH METAL-IRON GROUP METAL TARGET, ALLOY POWDER THEREFOR AND METHOD OF PRODUCING SAME

Shunichiro Matsumoto, Yasugi; Tsutomu Inui; Rokuo Ichiyasu, both of Yonago, and Yoshitaka Chiba, Gyoda, all of Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan

Filed Apr. 20, 1988, Ser. No. 183,993
Claims priority, application Japan, Apr. 20, 1987, 62-97057
Int. Cl.[5] B22F 3/00
U.S. Cl. 75—246 8 Claims



1. A target composed of at least one rare earth metal and at least one iron group metal, having a structure in which a eutectic alloy phase composed of said rare earth metal and said iron group metal and an iron group metal phase are bonded with each other via a diffusion bonding layer consisting essentially of a rare earth metal-iron group metal intermetallic compound.

4,957,550

ULTRASONIC MACHINING TOOL FOR MACHINING ORTHODONTIC BRACKETS

James F. Reber, Pomona, and Farrokh Farzin-Nia, Inglewood, both of Calif., assignors to Manufacturers Hanover Trust Co., New York, N.Y.

Division of Ser. No. 046,430, May 6, 1987, Pat. No. 4,838,786.
This application Sep. 1, 1988, Ser. No. 239,320
Int. Cl.[5] B22F 9/00
U.S. Cl. 75—246 1 Claim

1. A disposable ultrasonic machining tool for machining a plurality of orthodontic brackets at the same time, said tool being made of the following minimum materials by weight:

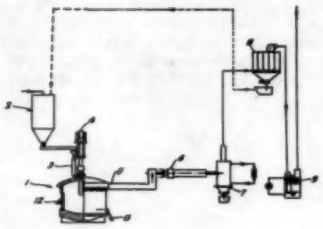
Nickel	5 percent (minimum)
Chromium	15 percent (minimum)
Cobalt	3 percent (minimum)
Graphite	.05 percent (minimum)
Miscellaneous	.1 percent
Iron	balance.

4,957,551

METHOD FOR TREATMENT OF DUST RECOVERED FROM OFF GASES IN METALLRUGICAL PROCESSES

Jan A. Aune, Langhus, and Thor Pedersen, Oslo, both of Norway, assignors to Elkem a/s, Norway

Continuation-in-part of Ser. No. 40,307, Apr. 20, 1987, abandoned. This application Jun. 20, 1988, Ser. No. 209,492
Claims priority, application Norway, Apr. 2, 1987, 871369
Int. Cl.[5] C22B 7/02
U.S. Cl. 75—657 12 Claims



1. A method for treatment of that dust precipitated from the waste gas of a metallurgical smelting process, said dust having a high metal chloride content, said method comprising the following steps:

(a) admixing said dust with a reducing agent and a flux;

(b) introducing said admixture to an operating gastight metallurgical smelting furnace, said smelting furnace producing an inert slag phase, a molten metal phase and a first gas phase, said first gas phase comprising dust from said smelting furnace, including metal chlorides, and off-gasses from said smelting furnace;

(c) tapping said furnace to remove said inert slag phase and said molten metal phase;

(d) removing said first gas phase from said smelting furnace;

(e) wet scrubbing said first gas phase to remove the metal chlorides and dust from said first gas phase and thereby producing a second gas phase and a metal chloride-containing and dust-containing first liquid phase;

(f) separating said first liquid phase into a dust-containing first sludge phase and a second liquid phase, said second liquid phase containing dissolved metal chlorides and residual dust;

(g) clarifying said second liquid phase to remove said residual dust from said second liquid phase and thereby producing a dust-containing second sludge phase and a third liquid phase containing metal chlorides;

(h) cooling said third liquid phase;

(i) bleeding a stream from said third liquid phase and removing the metal chlorides from said bleed stream and discharging the bleed stream; and

(j) drying said first and second dust-containing sludge phases.

4,957,552

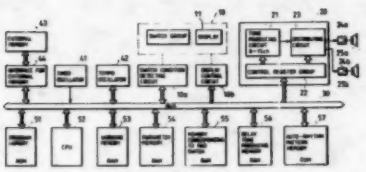
ELECTRONIC MUSICAL INSTRUMENT WITH PLURAL MUSICAL TONES DESIGNATED BY MANIPULATORS

Hiroyuki Iwase, c/o Yamaha Corporation, 10-1, Nakazawa-cho, Hamamatsu-shi, Shizuoka-ken, Japan

Filed Oct. 5, 1988, Ser. No. 253,964
Claims priority, application Japan, Oct. 7, 1987, 62-253133
Int. Cl.[5] G10H 7/00, 1/06, 1/18
U.S. Cl. 84—622 16 Claims

1. In an electronic musical instrument provided with plural manipulators indicating the generation of musical tones and musical tone generating means composed of plural musical tones and musical tone generating channels generating individual musical tones in accordance with the operation of said plural manipulators, the improvement comprising:

means for selectively designating a number of tones for each of said plural manipulators, said number of tones designated for each manipulator being generated by the operation of a corresponding manipulator; and



assignment control means for assigning each of said plural manipulators to said musical tone generating channels equal in number to said number of tones designated by said means for designating and controlling the generation of musical tones relative to each operated manipulator in said assigned musical tone generating channels.

4,957,553

INK FOR INK-JET RECORDING AND INK-JET RECORDING PROCESS EMPLOYING THE SAME

Shoji Koike, Yokohama, and Yasuko Tomida, Atsugi, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 1, 1987, Ser. No. 128,262

Claims priority, application Japan, Dec. 1, 1986, 61-287183; Dec. 1, 1986, 61-287184

Int. Cl.[5] C09D *11/02*

U.S. Cl. 106—20 **14 Claims**

1. An ink for ink-jet recording, comprising:

a coloring matter, a water-soluble organic solvent selected from the group consisting of amides, ketones, ketoalcohols, ethers, polyalkylene glycols, alkylene glycols, gylcerol, lower monoalkyl ethers of polyhydric alcohols, lower dialkyl ethers of polyhydric alcohols, sulforan, N-methyl-2-pyrrolidone, 1,3-dimethyl-2-imidazolidinone, methanol, ethanol, n-propanol, n-butanol, tert-butanol and n-pentanol, 75 to 90% by weight of water, and a defoaming material having a solubility to water of at least 0.1%, wherein said defoaming material is selected from the group consisting of (i) a secondary alcohol selected from the group consisting of isopropanol, 2-butanol, 2-pentanol, 3-pentanol, 2-hexanol, 3-hexanol and 2-methyl-4-hexanol, (ii) an ethylene oxide addition product thereof, (iii) a mixture of (i) and (ii), (iv) an acetylene alcohol, and (v) an acetylene glycol, and wherein said ink has a foam stability according to JIS K 3362 of 0 mm after 5 minutes.

4,957,554

DIMENSIONALLY-CONTROLLED CERAMICS

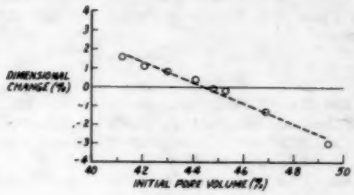
James P. Mathers, Woodbury, Minn., and Kathleen M. Humpal, River Falls, Wis., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 16, 1989, Ser. No. 394,574

Int. Cl.[5] C04B *35/18*

U.S. Cl. 106—35 **32 Claims**

1. A moldable unfired composition comprising a mixture of 12 to 27 weight percent magnesia, 27 to 45 weight percent alumina, and 37 to 51 weight percent silicon carbide powders of agglomerates thereof, said magnesia, alumina, and silicon



carbide powders and agglomerates having an overall average particle size of at most 5.0 micrometers.

4,957,555

CEMENTING COMPOSITIONS AND METHOD

John G. Wheeler, Pipe Creek, and Jose G. Garcia, San Antonio, both of Tex., assignors to Capitol Aggregates, Inc, San Antonio, Tex.

Filed Nov. 9, 1989, Ser. No. 434,723

Int. Cl.[5] C04B *7/21/28, 7/30*

U.S. Cl. 106—716 **16 Claims**

1. A cementing composition for forming a low density cement slurry comprising, for each 100 parts by weight, about 33 to 67 parts by weight of a pulverulent hydraulic cement and about 67 to 33 parts by weight of shot coke particles having a particle size of from about −8 to +200 mesh (Tyler) such that when admixed with water it will form a slurry having a density of about 13 pounds/gallon or less.

4,957,556

VERY EARLY SETTING ULTRA HIGH EARLY STRENGTH CEMENT

Hassan Kunbargi, 3166 Barrington #E, Los Angeles, Calif. 90066

Filed Jun. 8, 1989, Ser. No. 363,587

Int. Cl.[5] C04B *7/32*

U.S. Cl. 106—693 **15 Claims**

1. A method for forming a very early setting, ultra high strength cement, said method comprising the steps of:

forming a mixture of limestone, gypsum, and one of more members from the group consisting of bauxite, kaolinite, and high alumina clay such that said mixture has an overall molar ratio of A/F greater than or equal to approximately 0.64 and an overall molar ratio $\bar{S}/A+F$ between approximately 0.35 and 0.25, where A, F and $\bar{S}$ are respectively, Al_2O_3, Fe_2O_3 and SO_3:

hearing said mixture to an elevated temperature on the order of 1,000° C. to 1,386 2000° C. for a sufficient period of time to form a clinker having a concentration of $C_4A_3\bar{S}$ between 15% and 75% by weight;

determining the $C_4A_3\bar{S}$ present in said clinker; and

forming a final mixture of said clinker, CaO containing hydraulic cement and soluble $CaSO_4$ anhydride such that the composition of said final mixture includes a $C_4A_3\bar{S}$ content of 10% to 30% by weight and a soluble $CaSO_4$ anhydride content of 5% to 25% by weight.

4,957,557

SUBMICRON LIGNIN DISPERSIONS

Mitchell S. Dimitri, Charleston, S.C., assignor to Westvaco Corporation, New York, N.Y.

Filed Oct. 11, 1988, Ser. No. 255,444

Int. Cl.[5] C08L *97/02*

U.S. Cl. 106—123.1 **3 Claims**

1. A carbon black composition comprised of over 15%

carbon black, on a dry weight basis, a dispersant, water, and a colloidal lignin dispersion wherein the lignin is "A" lignin derived from the kraft pulping process and the dispersion is characterized by monodispersed lignin particles exhibiting a median lignin particle diameter size of less than about 300 angstroms.

4,957,558

TEMPORARY SOLIDIFIER FOR PLAYING WITH SAND

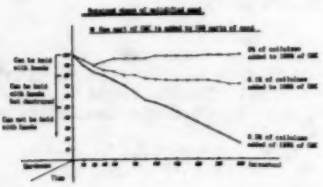
Hiroshi Ueda, and Tomonao Ueda, both of c/o Shinwa Industrial Co., Ltd., 3-16, Imai 3-Chome, Ome-Shi, Tokyo, Japan

Filed Jun. 13, 1988, Ser. No. 206,128

Claims priority, application Japan, Nov. 16, 1987, 62-289023

Int. Cl.[5] C08K *5/54*

U.S. Cl. 106—137 **4 Claims**



1. A solidified work having a shape and composed of silica or sand that is held together by a suitable quantity of water and a small quantity of an adhesive, the improvement comprising that said solidified work also includes a resolving enzyme in an amount sufficient to decompose the adhesive.

4,957,559

AQUEOUS MEDIUM OF A WATER INSOLUBLE ADDITIVE FOR MINERAL FIBER INSULATING MATERIALS

Hartmut Tiesler, Bockenheim, and Joseph Schirmeisen, Mutterstadt, both of Fed. Rep. of Germany, assignors to Isover Saint-Gobain, Courbevoie, France

Filed May 14, 1987, Ser. No. 49,534

Claims priority, application Fed. Rep. of Germany, May 15, 1986, 3616454

Int. Cl.[5] C08L *1/08*

U.S. Cl. 106—170 **7 Claims**

7. An aqueous emulsion of a water insoluble additive used with artificial mineral fiber insulating materials, consisting of a dispersion of a water insoluble additive selected from the group consisting of mineral oil, silicone, and mixtures thereof in an aqueous solution of a cellulose ether, wherein said cellulose ether is present in an amount between about 0.1–2.5% by weight relative to said water soluble additive.

4,957,560

CATIONIC AQUEOUS BITUMINOUS EMULSION-AGGREGATE SLURRIES

Peter Schilling, Charleston, S.C., assignor to Westvaco Corporation, New York, N.Y.

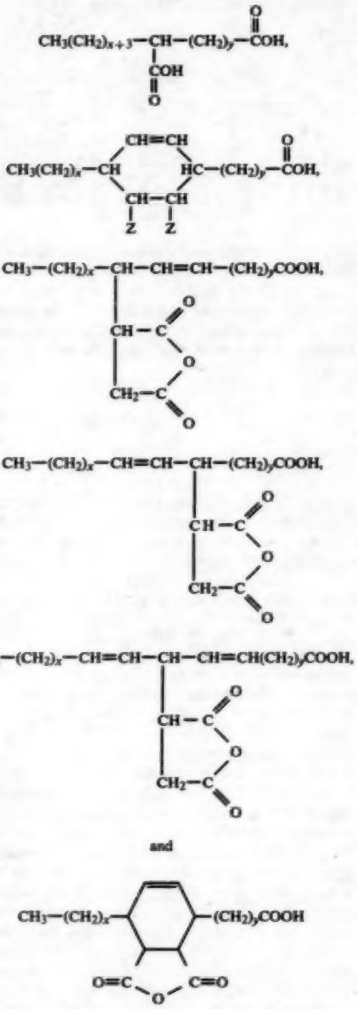
Continuation of Ser. No. 182,874, Apr. 18, 1988, Pat. No. 4,861,377. This application Mar. 16, 1989, Ser. No. 324,106

The portion of the term of this patent subsequent to Aug. 29, 2006, has been disclaimed.

Int. Cl.[5] C08L *95/00*

U.S. Cl. 106—277 **4 Claims**

1. A method of forming a bituminous emulsion at a temperature above 100° F. comprising from about 30% to about 80% by weight of bitumen, from about 0.1% to about 10% by weight of an emulsifier obtained by reacting a modified polyamine, formed by a Michael addition reaction of a polyalkylene polyamine with a 1,2-unsaturated acid, with a member of the group consisting of polycarboxylic acids and anhydrides of the following general formulae:



and

wherein x and y are integers from 3 to 9, x and y together equal 10–14, at least one Z is a carboxylic acid group and any remaining Z is hydrogen, and water to make up 100% by weight.

4,957,561

COMPOSITION FOR METALLIZING A SURFACE OF CERAMICS, A METHOD FOR METALLIZING, AND METALLIZED CERAMICS

Kiyoyuki Esashi, Higashiosaka, Japan, assignor to Nippon Hybrid Technologies Co., Ltd., Osaka, Japan

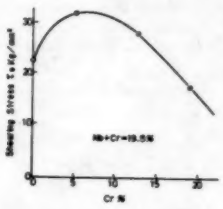
Continuation-in-part of Ser. No. 73,494, Jul. 15, 1987, abandoned. This application Nov. 22, 1988, Ser. No. 274,846

Int. Cl.[5] C09D *1/00*

U.S. Cl. 106—286.3 **9 Claims**

1. A composition for metallizing a surface of ceramics by a

melting process, said composition essentially consisting of 3.0 to 22.0% by weight of Nb, not more than 20.0% by weight of Cr, the sum of Nb and Cr being 13.0 to 25.0% by weight, 0.5 to 8.0% by weight of at least one of Zr, Ti, and Hf, 1.5 to 3.5%



by weight of C, 1.5 to 3.5% by weight of Si, 0.5 to 18.0% by weight of SiC, not more than 10.0% by weight of at least one of Fe, Co, Cu, Mn, Pd, Pt, Ag, Al, Rh, Ru, Au, and V, not more than 22.0% by weight of at least one of W, Ta, Re, and Os, and the balance being Ni.

4,957,562

CHROME OXIDE GREEN, A PROCESS FOR ITS PREPARATION AND ITS USE

Jakob Rademachers; Dieter Räde; Hans-Ulrich Höfs; Günther Teichmann, and Gerhard Trenczek, all of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany

Filed Oct. 19, 1988, Ser. No. 259,597

Claims priority, application Fed. Rep. of Germany, Oct. 31, 1987, 3736994

Int. Cl.[5] C09C *1/34*

U.S. Cl. 106—453 **14 Claims**

1. Chrome oxide green pigment composition having a water number in the range of from 10 to 40 g/100 g.

4,957,563

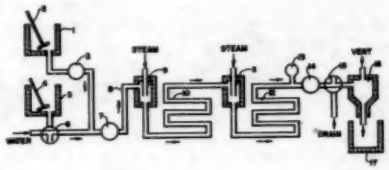
STARCH CONVERSION

T. L. Gallaher, and Thomas L. Small, both of Muscatine, Iowa, assignors to Grain Processing Corporation, Muscatine, Iowa

Filed Dec. 14, 1987, Ser. No. 132,426

Int. Cl.[5] C13K *1/06*

U.S. Cl. 127—38 **6 Claims**



1. A process for producing a starch paste which consists essentially of:

flowing together without mechanical agitation a stream of an aqueous starch slurry and a liquid stream containing a starch depolymerizing enzyme in an amount sufficient to gelatinize and paste the starch and reduce the viscosity of the starch paste within a period of not more than 5 minutes at a temperature from about 160 to 280° F.,

pumping said combined streams through a starch conversion conduit wherein starch is heated for a period of not more than about 5 minutes to a temperature of from about 160 to 280° F.,

then flowing the pasted starch through an enzyme inactivating conduit wherein the pasted starch is maintained at a temperature sufficient to substantially inactivate the starch depolymerizing enzyme, and

recovering the resulting starch paste.

4,957,564

PROCESS FOR PREPARING LACTULOSE FROM LACTOSE BY EPIMERIZATION WITH SODIUM ALUMINATE

Renato Carobbi, Pistoia, and Franco Innocenti, Bagno A Ripoli, both of Italy, assignors to SIRAC S.r.l., Italy

Filed Nov. 17, 1988, Ser. No. 272,445

Claims priority, application Italy, Dec. 1, 1987, 22847 A/87

Int. Cl.[5] C13K *13/00*; C13D *3/14, 3/00*

U.S. Cl. 127—46.3 **10 Claims**

1. A process for preparing lactulose from lactose by epimerization with sodium aluminate, comprising the following steps:

(a) reacting an aqueous mixture of lactose with sodium aluminate to form a solution containing lactulose;

(b) continuously neutralizing the solution obtained from step (a) by feeding said solution and a sulphuric acid solution to a reactor simultaneously;

(c) separating the aluminum hydroxide by a centrifugal decanter;

(d) subjecting the solution obtained from step (c) to ultrafiltration or microfiltration;

(e) deionizing the solution obtained from step (d);

(f) concentrating the solution obtained from step (e) to a concentration of about 50% of lactulose by weight;

(g) treating the solids obtained from steps (c) and (d) with a NaOH solution;

(h) calcining the product of step (g) to obtain sodium aluminate which is recycled to step (a).

4,957,565

PROCESS FOR PRODUCING STARCH FROM CEREALS

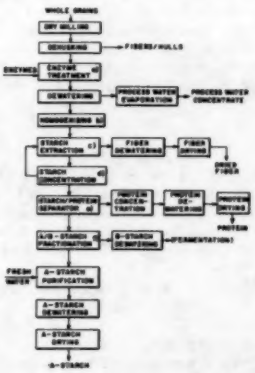
Antti Lehmussaari, Rajmaki, Finland, and Wim van der Ham, Hoevelaken, Netherlands, assignors to Dorr-Oliver Incorporated, Milford, Conn. and Alko Ltd., Helsinki, Finland

Filed Oct. 9, 1987, Ser. No. 106,209

Claims priority, application Netherlands, Nov. 11, 1986, 8602850

Int. Cl.[5] C08B *30/04, 30/08*

U.S. Cl. 127—68 **2 Claims**



1. A process for producing starch from cereals, characterized in that it comprises the consecutive steps of:

(a) subjecting dry-ground dehusked grains to a treatment with an enzyme mixture such that the compounds present in the grains, except starch, are hydrolyzed and solubilized said enzyme mixture having proteolytic, cellulase,

hemicellulase, beta—glucanase and pectinase activity, and substantially no alpha—amylase activity,

(b) optionally homogenzing the product obtained,

(c) extracting the starch from the product obtained, leaving fibres,

(d) concentrating the starch giving a crude starch fraction and a process water fraction,

(e) separating proteins from the crude starch fraction obtained and

(f) separating the protein-free crude starch fraction thus obtained into a primary and secondary starch fraction.

4,957,566

ACID CLEANING OF DRUMS WITH INTERIOR LININGS

Ronald J. Evans, 41 Colony Rd, and Janice E. Hamilton, 50 Colony Rd., both of Gretna, La. 70053

Continuation-in-part of Ser. No. 796,159, Nov. 8, 1985, abandoned. This application Dec. 31, 1985, Ser. No. 814,976

Int. Cl.[5] B08B *9/00*

U.S. Cl. 134—22.14 **4 Claims**

1. A method of economically cleaning steel drums that have an interior baked-in lining and wherein the drums have been initially previously cleaned of previous contents and dried completely, the method being useful for completely removing epoxy, phenolic, any combination of epoxy phenolic blend of linings and other linings from drums such as 55 gallon closed type drums comprising substantially the steps of initially supplying the drums from a source of supply, then preheating the drums to a temperature of about 130°F., next introducing a metered quantity of sulfuric acid of about 98% purity into the drums from a source of supply of acid, providing a pumping area, a holding area, and a storage area for the sulfuric acid, then screwing plugs into the drums so that the acid will not leak out, next revolving the drums and tilting the drums so that the interior of the drums are totally exposed to the acid, then removing the plugs and the excess acid from the drums so that remaining in the drums is only that acid that clings to the walls of the drums and that part of the lining that still clings to the walls of the drums, conveying the drums a distance to increase the time of exposure to the acid and passing the drums through a heating area to heat the drums from ambient to several hundred degrees Fahrenheit, next introducing a cleaning solution such as hot caustic soda into the drums to neutralize any acid therein, then placing chains in the interior of the drums and then moving the drums to a rocking area to move the chains back and forth on the bottom of the drums, turning the drums so that the drums are scratched by the chains, then removing the chains, next rinsing the drums of the solution therein, then syphoning out the material in the drums and drying and inspecting the drums, and finally moving the drums to a storage area.

4,957,567

FATIGUE CRACK GROWTH RESISTANT NICKEL-BASE ARTICLE AND ALLOY AND METHOD FOR MAKING

Daniel D. Krueger; Robert D. Kissinger, both of Cincinnati; Richard G. Menzies, Wyoming, and Carl S. Wukusick, Cincinnati, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Dec. 13, 1988, Ser. No. 284,008

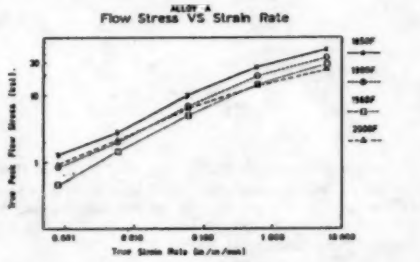
Int. Cl.[5] C22F *1/10*

U.S. Cl. 148—12.7 N **20 Claims**

1. In a method of making an article from a gamma prime precipitation strengthened nickel-base superalloy having a gamma prime solvus temperature and an incipient melting temperature, the steps of:

providing a nickel-base superalloy (a) which includes a gamma prime content in the range of about 30–46 volume percent, and (b) which has a quench crack resistance to enable rapid quenching substantially without cracking from a preselected supersolvus solutioning temperature, above the gamma prime solvus temperature and below the incipient melting temperature, to a preselected quenching temperature;

working the superalloy at preselected working conditions, including a working temperature below the gamma prime solvus, at a strain rate less than a predetermined critical strain rate, E_c, to provide a worked structure having a grain size substantially no larger than about ASTM 10, a precipitate of gamma prime, and a high temperature carbide precipitate comprising MC carbide;



heating the worked structure at the supersolvus solutioning temperature for a time sufficient to solutionize substantially all of the gamma prime but not the MC carbide, and to coarsen grains uniformly to a range of about ASTM 2–9; and

quenching the structure rapidly to the quenching temperature to reprecipitate gamma prime without substantial cracking of the structure.

4,957,568

COMPOSITION AND PROCESS FOR ACTIVATING METAL SURFACES PRIOR TO ZINC PHOSPHATING AND PROCESS FOR MAKING SAID COMPOSITION

Helmut Endres; Peter Christophliemk; Karl-Dieter Brands; Wolf-Achim Roland, and Joerg Riesop, all of Duesseldorf, Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Apr. 28, 1989, Ser. No. 345,063

Claims priority, application Fed. Rep. of Germany, Apr. 28, 1988, 3814287

Int. Cl.[5] C23C *16/02*

U.S. Cl. 148—254 **20 Claims**

2. A process for preparing polymeric titanium(IV) phosphates that are suitable for mixing with water to form a dispersion effective for activating the surafces of metals prior to phosphating treatments, said process comprising chemically reacting a mixture comprising:

(I) a titanium(IV) compound,

(II) a material selected from the group consisting of phosphoric acid and alkali metal phosphates, and

(III) water,

to produce said polymeric titanium(IV) phosphates, wherein the improvement comprises the presence in said mixture during at least a part of said reacting of an amount of titanium(IV) complexing agent that is less than the stoichiometric amount, based on the titanium(IV) content of said mixture.

4,957,569

BINDING ADDITIVE FOR EXPLOSIVE COMPOSITIONS

Kevin H. Waldock, Mount Thorley, and Daniel A. Wasson, Singleton, both of Australia, assignors to CBS Explosives Pty Limited, New South Wales, Australia

Filed Nov. 16, 1988, Ser. No. 271,715

Claims priority, application Australia, Nov. 18, 1987, PI5548

Int. Cl.[5] C06B *45/02*

U.S. Cl. 149—21 **4 Claims**

1. A dry mix explosive composition, including:

50–72% (by weight) ammonium nitrate;

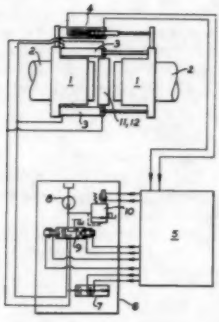
2–4% (by weight) fuel oil;
10–15% (by weight) bulking agent; and
15–20% (by weight) of a water-in-oil emulsion, comprising a water-based solution of oxidizer salts held in a disperse phase in oil.

4,957,570

BUTT-WELDING OF PIPES

Patrick W. Jenkins, Dronfield; Edwin A. W. Dunkey, Dronfield Woodhouse, and Roy Cartwright, Dronfield, all of England, assignors to Fusion Group PLC, Dronfield, England

Division of Ser. No. 59,059, Jun. 8, 1987, abandoned. This application Jun. 6, 1989, Ser. No. 361,959
Claims priority, application United Kingdom, Jun. 25, 1986, 8615517
Int. Cl.[5] B29C *65/20*
U.S. Cl. 156—64 **4 Claims**



1. A method for the butt-welding of pipes comprising locating the ends of pipes in respective clamps which clamps are movable towards and away from each other under hydraulic power, effecting trimming of the pipe ends against a trimmer plate in conventional manner urging the trimmed pipe ends into contact to check that the trimmed pipe ends are in contact around their full periphery, sensing the distance moved by the clamps from their position of rest to their position where the pipe ends are in contact storing the information on distance moved in microprocessor control means having been preprogrammed with an additional required clamp movement, withdrawing the clamps, inserting a heater plate between the pipe ends, moving the clamps towards each other to bring the pipe ends into contact with the heater plate and until the clamps have moved said stored distance moved plus said preprogrammed additional required clamp movement and whereby a bead of a correct required size is formed on the ends of the pipes.

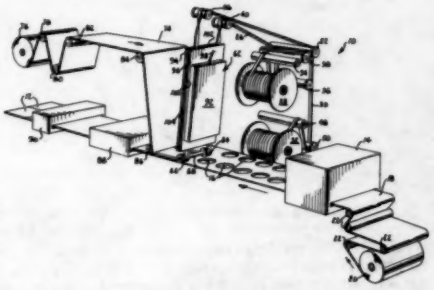
4,957,571

METHOD FOR APPLYING RECLOSABLE FASTENER TO PACKAGE

Peter C. Cipolla, El Toro, Calif., assignor to Multivac, Kansas City, Mo.

Filed Dec. 1, 1988, Ser. No. 278,586
Int. Cl.[5] B32B *31/08*
U.S. Cl. 156—66 **10 Claims**

1. A method for forming a reclosable package having confronting walls, said method comprising the steps of:
providing a web of sheet material from a supply source;
providing an extended length of separable fastener strip from a supply source;
forming said confronting walls of said reclosable package from said web of sheet material;
directing said fastener strip along a linear path of travel toward said confronting walls;
tensioning said fastener strip in a linear direction along said path;
heating said fastener strip across its entire cross sectional dimension while said tensioning step occurs and before said fastener strip reaches said confronting walls;



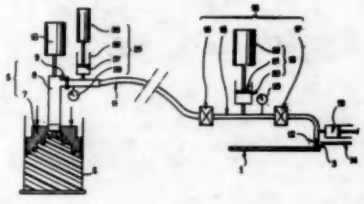
continuing advancement of said fastener strip in a linear direction;
then introducing said fastener strip between the confronting walls;
sealing said fastener strip to the confronting walls; and
sealing together the confronting walls to form said reclosable package.

4,957,572

METHOD AND APPARATUS FOR THE PRODUCTION OF A BEAD OF ORGANIC MATERIAL INTENDED TO SERVE AS A SEAL AND INSERT IN A MULTIPLE GLAZING

Philippe Dewitte, Thourotte; Michel Canaud, Paris, and René Poix, Noyon, all of France, assignors to Saint-Gobain Vitrage, Courbevoie, France

Filed Jun. 5, 1989, Ser. No. 361,352
Claims priority, application France, Jun. 17, 1988, 88 08135
Int. Cl.[5] B32B *31/12*
U.S. Cl. 156—109 **17 Claims**



12. A process for forming a uniform bead of organic material having a butyl rubber base, with a viscosity greater than 35000 poises, comprising the steps of:
using a reciprocating pump having a heating conical piston to heat and pump the organic material from a drum;
conveying the material via a pipe to an output nozzle to form the uniform bead; and
selectively storing the organic material in a lock chamber in said conduit.

15. The process of claim 12 including the step of applying said bead to a multiple glazing so as to make an insert seal for said multiple glazing.

4,957,573

METHOD FOR PLACING AN INNER TUBE INTO A TIRE LINED WITH SEALANT

Edward N. Gomberg, 572 River St., Chattanooga, Tenn. 37405

Filed Jul. 31, 1989, Ser. No. 387,675
Int. Cl.[5] B29C *73/22, 73/00*
U.S. Cl. 156—115 8 Claims

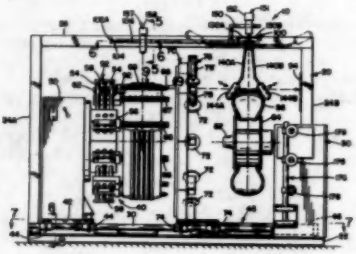
1. A method of placing an inner tube in a tire casing wherein either the inner tube or the tire casing has been lined with a layer of tacky sealant material comprising applying a layer of anti-tack material on to the sealant, or to a surface opposing the sealant, or both, said anti-tack material rendering the sealant nonadhering with respect to the opposing surface for a sufficient period of time to allow proper placement and inflation of the inner tube within the casing but permitting the sealant to regain its tacky surface after inflation of the inner tube.

4,957,574

TREAD CENTERING METHOD AND APPARATUS

Andrew R. Clayton, Salisbury, N.C., and Robert A. Cronin, Irvine, Calif., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Apr. 3, 1989, Ser. No. 331,777
Int. Cl.[5] R29D *30/52*
U.S. Cl. 156—126 17 Claims



1. A method for centering an annular tread on a pneumatic tire casing, the method comprising the steps of:

determining the location of the equatorial plane of the casing or the wheel;

mounting the annular tread on a tread expander assembly;

establishing a first plane location axially spaced a fixed distance from and parallel to the equatorial plane of the casing or wheel;

positioning the tread on the tread expander assembly such that the circumferential centerline of the tread is coincident with said established first plane;

expanding the tread as required to permit the tread to encircle the casing; and

providing relative axial movement between said tread expander and a casing mounted on said wheel to bring the centerline of said tread and the equatorial plane of said casing mounted on said wheel into coincidence, said relative axial movement being a fixed distance equal to the fixed distance between said established first plane and the determined equatorial plane of a casing mounted on said wheel.

6. An apparatus for centering an annular tread on a casing having an equatorial plane, the apparatus comprising:

a frame;

a wheel mounted on the frame and adapted for receiving and mounting a casing;

a tread expander adapted for receiving an annular tread at a location axially spaced from said wheel;

means for determining the axial location of the equatorial plane of a casing mounted on said wheel;

means for establishing a first plane location axially spaced a fixed distance from and parallel to the equatorial plane of the casing or wheel;

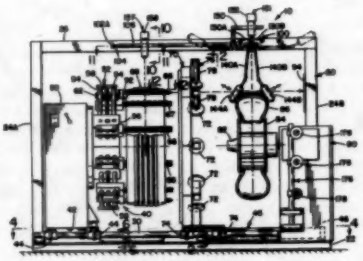
means for providing relative axial movement between said tread expander and a casing mounted on said wheel to bring the circumferential centerline of a tread into coincidence with the equatorial plane of the casing, said tread being positioned on the tread expander assembly such that the circumferential centerline is coincident with said established first plane prior to relative axial movement, said relative axial movement being a fixed distance equal to the fixed distance between said established first plane and the determined equatorial plane of a casing mounted on said wheel.

4,957,575

TREAD APPLICATION METHOD AND APPARATUS

Robert A. Cronin, Irvine, Calif., assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 31, 1989, Ser. No. 332,252
Int. Cl.[5] B29D *30/58*
U.S. Cl. 156—126 14 Claims



1. A method for clamping an annular tread to a pneumatic tire casing, the method comprising the steps of:

mounting the casing on a wheel;

mounting the annular tread on a tread expander assembly, the tread expander assembly being movable along a line coincident with or parallel to the wheel rotational axis, the tread expander assembly having means expandable outwardly and retractable inwardly along the radial direction of the wheel for selectively stretching the tread by radially outward displacement of the tread at a number of spaced points on the radially inner side of the tread, thereby to expand the tread to a size sufficient to circumferentially surround the casing;

moving the tread axially toward the casing to a position where the stretched, annular tread circumferentially surrounds and is centered on the casing;

encircling the casing and stretched tread with a clamping assembly, the clamping assembly having a plurality of spaced clamping means and, using such assembly and without rotating the casing or tread relative to such clamping assembly, clamping the stretched tread to the casing by sequentially or simultaneously pressing on the

radially outwardmost surface of the tread at spaced clamping points, each clamping point being located between points where stretching force is applied;

unclamping the stretched tread at the clamping points; and

transferring the annular tread from the tread expander assembly onto the casing by moving the tread expander assembly axially away from the casing.

8. An apparatus for clamping an annular tread to a casing, the apparatus comprising:

a frame;

a wheel adapted for receiving and mounting a casing, the wheel being mounted on the frame;

a tread expander assembly, the tread expander assembly being movable along a line coincident with or parallel to the wheel rotational axis, the tread expander assembly having means expandable outwardly and retractable inwardly along the radial direction of the wheel for selectively stretching the tread by radially outward displacement of the tread at a number of spaced points on the radially inner side of the tread, the tread expander assembly being slidable in an axial direction relative to the wheel rotational axis a distance sufficient to align the centerplane of the annular tread with the equatorial plane of the casing; and

a clamping assembly mounted on the frame, the clamping assembly, having a plurality of spaced clamping means for clamping, without rotation of the casing or tread relative to the clamping assembly, the radially outermost surface of the tread at a plurality of spaced points, each point being located between points where the tread expander assembly applied stretching force to the tread.

4,957,576

METHOD FOR PROTECTING LIGHT CONDUCTIVE FIBER ENDS PROJECTING FROM A FIBER REINFORCED PART

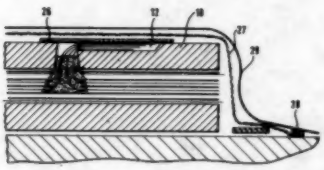
Manfred Fischer, Bremen, and Bernd Hofer, Lemwerder, both of Fed. Rep. of Germany, assignors to MBB GMBH, Bremen, Fed. Rep. of Germany

Filed Nov. 23, 1988, Ser. No. 275,758

Claims priority, application Fed. Rep. of Germany, Nov. 27, 1987, 3740272

Int. Cl.[5] B29C *63/18, 65/54;* G01B *11/16*

U.S. Cl. 156—166 **2 Claims**



1. Method for the protection of light conductive fiber ends, the fibers being embedded as crack monitors in fiber reinforced compound material comprising the steps of:

slipping the fiber ends into relatively short polytetrafluoroethylene hoses but being provided to be at least in part embedded in the compound material of which parts are to be made the fiber ends, projecting from the hose;

closing an end of the hose that will be embedded with a cold curing laminate resin without filling the hose;

partially embedding the fiber ends with enclosing polytetrafluoroethylene hoses to project from openings during assembly of the part and inserting the projecting fiber ends with said enclosing hoses in a conical bore of an assembly device;

filling said openings and portions adjacent to the conical bore of the assembly tool with laminate resins;

placing a protective cover onto said bore and over the polytetrafluoroethylene hose protected fiber end prior to curing of the part; and

curing the thus prepared part in an autocave.

4,957,577

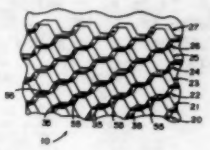
METHOD FOR MAKING WELDED HONEYCOMB CORE

Fritz Huebner, Zeeland, Mich., assignor to Plascore, Inc., Zeeland, Mich.

Filed Apr. 4, 1988, Ser. No. 177,437

Int. Cl.[5] B32B *3/12*

U.S. Cl. 156—197 **23 Claims**



1. A method of fabricating a structural honeycomb core comprising:

superimposing first and second strips of thermoplastic with the opposite lateral edges of each aligned;

placing release substrates at first spaced locations along the length of the superimposed strips on the side of the first strip opposite the second strip;

welding the superimposed strips to one another at the first spaced locations;

superimposing a third strip of thermoplastic over the second strip with the lateral edges of each aligned after the welding of the first and second strips;

placing release substrates between the second and first strips at second spaced locations between the first spaced locations;

welding the superimposed third and second strips to one another at the second spaced locations; and

expanding the welded strips to form a honeycomb structure.

4,957,578

PROCESS FOR PRODUCING A PAPERBOARD PRODUCT FOR PREMIUM PACKAGING APPLICATIONS

Todd H. Huffman, Roanoke, Va.; Debora F. Massouda, Silver Spring, Md., and Thomas S. Williams, III, Covington, Va., assignors to Westvaco Corporation, New York, N.Y.

Filed Mar. 22, 1989, Ser. No. 327,516

Int. Cl.[5] B29C *47/06*

U.S. Cl. 156—244.11 **6 Claims**

1. A process for producing a paperboard product having a brightness of at least about 83 TAPPI Brightness and a Hunter gloss of 100-plus at an angle of 60 degrees suitable for use as a premium packaging material comprising the steps:

(a) applying a surface treatment to one surface of a paperboard substrate to improve its adhesion to a subsequent coating layer;

(b) passing the treated paperboard into a nip formed between a chill roll and a backup roll while simultaneously extruding onto the treated surface of the paperboard a polyolefin coating selected from the group consisting of polyethylene, low density polyethylene, linear low density polyethylene, and polypropylene containing a bright, white pigment;

(c) applying a surface treatment to the exposed surface of said polyolefin coating to improve its adhesion to a subsequent coating layer; and,

(d) passing the treated and coated paperboard into a second nip formed between a chill roll and a backup roll while

simultaneously extruding onto the treated surface of said pigmented polyolefin coating a clear coating of a polyester material selected from the group consisting of polyethylene terephthalate (PET), glycol-modified PET, acid-modified PEt, polybutylene terephthalate, polycarbonate and nylon to produce a defect-free, glossy surface.

4,957,579

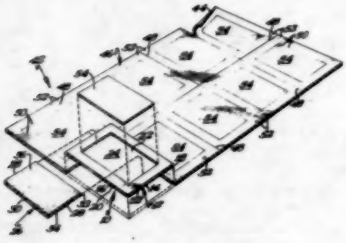
METHOD AND APPARATUS FOR APPLYING LIQUID ACID TO A SURFACE

Glenn C. Knowlton, 2262 Bronson Dr., St. Paul, Minn. 55112

Division of Ser. No. 78,038, Jul. 27, 1987, Pat. No. 4,834,803. This application May 26, 1989, Ser. No. 357,820

Int. Cl.[5] B32B *31/18*; B65B *43/00*

U.S. Cl. 156—248 **4 Claims**



1. Method of fabricating a pack for applying liquid acid to a treatment surface comprising the steps of:

(a) providing a supply stock of a layered assemblage including a layer of flexible material having an inner surface, pressure sensitive adhesive located on the inner surface of the flexible material, and an adhesive covering, with the flexible material being impervious to breaking down by the liquid acid, with the pressure sensitive adhesive being impervious to breaking down by the liquid acid and having sufficient adherence to the flexible material and the treatment surface to achieve a tight seal between the flexible material and the treatment surface creating a pocket for receipt of the liquid acid to be suspended and concentrated within the pocket adjacent to the treatment surface;

(b) stencil cutting a first cut through the layer of flexible material, the pressure sensitive adhesive, and the adhesive covering layer, with the first cut having a perimeter defining an area;

(c) stencil cutting a second cut simultaneously with the first cut through the adhesive covering layer while maintaining the layer of flexible material in tact to divide the adhesive covering layer into a central portion defined by the second cut having a perimeter defining an area smaller than the perimeter and the area of the first cut and a perimeter portion defined between the first and second cuts, with the second cut being concentric and not intersecting with the first cut; and

(d) providing material for absorbing liquid acid and providing for carrying and uniformly spreading the liquid acid, with the absorbing material being flexible, with the absorbing material having a perimeter defining an area complementary to and substantially the same as the perimeter and area of the second cut allowing removal of the central portion of the adhesive covering from the first surface of the sheet to allow securement of the absorbing material while the perimeter portion of the adhesive covering is maintained in a covering relation for providing support for the flexible material.

4,957,580

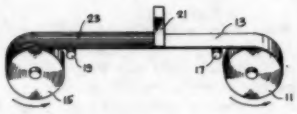
METHOD FOR MAKING AN OPTICAL DATA CARD

Jerome Drexler, and Joseph B. Arnold, both of Los Altos Hills, Calif., assignors to Drexler Technology Corp., Calif.

Division of Ser. No. 855,228, Apr. 23, 1986. This application Oct. 3, 1988, Ser. No. 252,829

Int. Cl.[5] B32B *31/18*; G06K *19/00*

U.S. Cl. 156—250 **16 Claims**



1. A method of making a wallet size data card comprising the steps of,

preformatting a roll of optical recording tape with a continuous pattern of straight solid parallel lines defining a set of parallel, spaced apart, prerecorded servo tracks,

adhering strips of said tape to card base material so that ends of said strip extend beyond opposite ends of the length of a data card, and

cutting said strip such that ends of the strip coincide with ends of the card.

4,957,581

METHOD AND APPARATUS FOR CENTERING TUBES

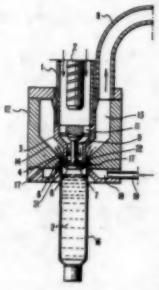
Günter Jährig, Eggenstein-Leopoldshafen; Lutz Langenhahn, Ettlingen, and Robert Riedl, Karlsruhe, all of Fed. Rep. of Germany, assignors to IWK Verpackungstechnik GmbH, Stutensee, Fed. Rep. of Germany

Filed Dec. 29, 1988, Ser. No. 291,586

Claims priority, application Fed. Rep. of Germany, Dec. 29, 1987, 3744402

Int. Cl.[5] B65B *7/06*, *51/20*, *51/32*

U.S. Cl. 156—309.9 **8 Claims**



1. An apparatus for heating edges of a filling opening of a packing container by hot gas for a subsequent closing of the filling opening, with a nozzle means being introducible into the filling opening at a container open end for supplying the hot gas by a substantially radially outwardly directed gas discharge, characterized in that centering means are provided for centering the container open end without contacting the container open end including means disposed externally of the container at a position spaced axially forward of the nozzle means, as viewed in a direction of a closed end of the container, for directing a centering fluid at the container open end with a component of flow of the centering fluid in an axial direction of the container.

8. A method for centering a packing container in a device for

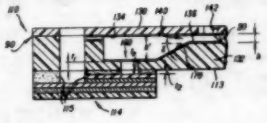
heating an open end of the packing container by supplied hot air for enabling a subsequent welding of edges of the open end of the container, the method comprising the step of supplying a centering gas from an external source to the exterior of the open end of the container from a position disposed forwardly, as viewed in a direction of a closed end of the container, of a point of location of the supply of hot air, and directing the centering gas so as to provide for a component of flow of the centering gas in an axial direction of the container.

4,957,582

CAPILLARY TRANSPORT ZONE COATED WITH ADHESIVE

Richard L. Columbus, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 16, 1989, Ser. No. 324,140
Int. Cl.[5] C09J *5/00*
U.S. Cl. 156—332 **12 Claims**



7. A method of making a device containing a liquid transport zone capable of transporting a patient sample through the zone via capillary action, said zone comprising opposing surfaces joined together so as to provide a capillary spacing between said surfaces, said surfaces comprising a supporting material having an equilibrium contact angle with serum that is outside the range of about 30° to about 80°,

the method comprising the steps of

(a) providing said supporting material configured with said opposing surfaces;

(b) coating at least a portion of said supporting material of at least one of said surfaces with an adhesive capable of bonding together said supporting material of said surfaces, said adhesive, when cured, having an equilibrium contact angle with serum that is less than about 80° and greater than about 30°, some of the adhesive being applied in at least a portion of the area of said transport zone;

(c) joining said supporting materials; and

(d) curing said adhesive.

4,957,583

APPARATUS FOR ETCHING PATTERNED SUBSTRATES

Roy V. Buck, Oak Ridge, and Darrell P. Adams, Greensboro, both of N.C., assignors to Analog Devices, Inc., Norwood, Mass.

Filed Apr. 28, 1989, Ser. No. 345,079
Int. Cl.[5] B44C *1/22*; C23F *1/02*; C03C *15/00, 25/06*
U.S. Cl. 156—345 **3 Claims**

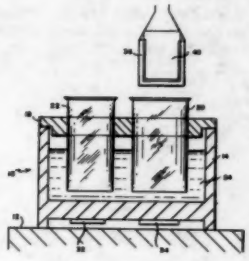
1. Apparatus for practicing the wet etching of a workpiece including a metallization layer on a substrate, comprising:

a. a first vessel at least partially filled with a coupling fluid;

b. a second vessel containing an etchant solution and having an aperture large enough to receive the workpiece therein;

c. means for suspending the second vessel in the coupling fluid of the first vessel;

d. an ultrasonic generator means coupled to the first vessel to impart ultrasonic vibrations to the coupling fluid and, via the coupling fluid and second vessel, to the etchant solution; and



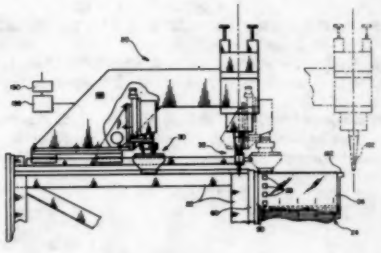
e. means for vibrating the workpiece when said workpiece is disposed in said second vessel and said second vessel is disposed in said first vessel.

4,957,584

APPARATUS FOR FORMING ENDLESS LOOPS FROM SHEET MATERIAL

Frank Castrignano, Fairport; James C. Foote, Jr., York; Robert E. Marowski, Rochester, and Richard D. Young, Fairport, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 18, 1989, Ser. No. 353,833
Int. Cl.[5] B29C *65/08*
U.S. Cl. 156—361 **10 Claims**



1. Apparatus for splicing together opposite ends of a sheet of material to form an endless loop of such material, the sheet having identifiable features located at a predetermined relationship along the sheet, the apparatus comprising:

a generally cylindrical drum having first and second axially extending edges,

means for adjusting the drum edges relative to each other to vary the circumference of the drum,

means for holding the sheet on the drum with the opposite ends of the sheet being in overlapping relationship adjacent the drum edges,

means for sensing the relationship between the identifiable features at the overlapping ends of the sheet when the sheet is being held on the drum,

control means for operating the adjusting means to vary the circumference of the drum and thus adjust the relationship between the identifiable features at the overlapping ends until the predetermined relationship is obtained, and

means for bonding the opposite ends of the sheet together after such predetermined relationship is obtained.

4,957,585

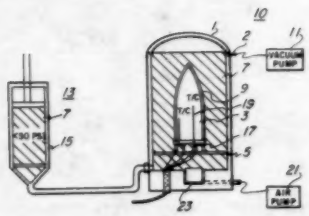
HIGH PRESSURE LAMINATION CHAMBER

Louis R. Semff, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 103,082, Sep. 30, 1987, abandoned. This application Jan. 23, 1989, Ser. No. 300,750

Int. Cl.[5] B32B *31/20*

U.S. Cl. 156—382 **10 Claims**



1. A pressure laminating device comprising:

a vessel capable of containing pressurized solid granular material;

a shaping tool mounted in the vessel for receiving a resin containing material;

a pump for applying a pressure level of up to about 50 psi in the vessel in order to compress the solid granular material against the resin containing material; and

a mechanical compression system for further compressing the solid granular material to a pressure level of up to about 3,000 psi and causing the resin containing material to conform to the tool shape.

4,957,586

APPARATUS FOR PRODUCING A WOUND PLASTIC TUBE

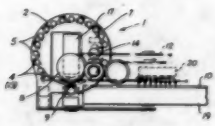
Rachid Keldany, Maur, and Keith J. Shaw, Pfäffikon, both of Switzerland, assignors to Ametex AG, Niederurnen, Switzerland

Continuation of Ser. No. 180,912, Apr. 13, 1988, abandoned. This application Aug. 17, 1989, Ser. No. 395,156

Claims priority, application Switzerland, Apr. 14, 1987, 1449/87

Int. Cl.[5] B29C *63/34*

U.S. Cl. 156—428 **11 Claims**



1. An apparatus for producing a tube wound from a plastic web material and for feeding the formed tube into an existing pipe for interiorly relining it, said apparatus comprising: a stationary, cage-like winding drum having an inner surface along which one side of a laterally moving plastic material web is received so that the web is wound spirally into a tube while adjoining web edges are joined together, the opposite side of the web being free and not in contact with any guide surface carried by the drum, web advancing means operative to advance said plastic material web into the winding drum, edge joining means operative to join adjacent edges of the spirally wound web to each other, a plurality of spaced, circularly arranged rod shaped cylindrical members defining the cage-like winding drum, which cylindrical members each have a length substantially greater than the width of said web and extend between the two spaced face flanges defining opposed ends of the drum,

in which at least a number of said rod shaped cylindrical members are motor driven to rotate about their respective axes and to thereby contact and advance said web along the interior of said drum to wind the web spirally into a tube, and to thereby also contact and advance the resulting spiral wound tube, respectively, while adjoining edges of the web are joined together, and drive means for driving said rod-shaped driven members.

4,957,587

APPARATUS FOR PLACING A STRIP OF THERMOPLASTIC MATERIAL AROUND AN OBJECT

Manfred Rauch, Sasbach, Fed. Rep. of Germany, assignor to Fromm Holding AG

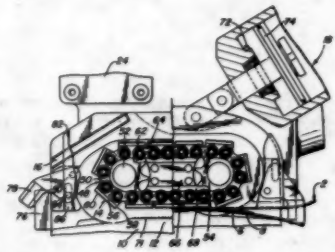
PCT No. PCT/CH88/00034, § 371 Date Nov. 30, 1988, § 102(e) Date Nov. 30, 1988, PCT Pub. No. WO88/07473, PCT Pub. Date Oct. 6, 1988

PCT Filed Feb. 11, 1988, Ser. No. 295,250

Claims priority, application Switzerland, Mar. 31, 1987, 1227/87

Int. Cl.[5] B65B *13/22, 13/32*

U.S. Cl. 156—495 **18 Claims**



1. An apparatus for placing a strip of thermoplastic synthetic material about an object, with strip support means (12) to be placed against the object (4) and gripping jaws (14), at least one of the strip support means and the gripping jaws being advanceable relative to and urgeable toward the other of the strip support means and the gripping jaws for conveying, tensioning and welding two portions (6, 8) of the strip lying one above the other on the strip support means (12), working and supporting surfaces of the gripping jaws and strip means being provided with teeth, characterized in that said apparatus comprises driven, continuous chain belt means (48, 142, 156) running over two guide wheels (52, 54, 144, 146, 170, 172) and carrying a plurality of gripping jaws (14) so that at least one gripping jaw (14) is at all times engageable with a corresponding portion of the strip (6).

4,957,588

METHOD FOR HIGH TEMPERATURE REACTION PROCESS

Mitsunobu Koshiba, Shinyoshida; Yoshiyuki Harita, Shirahata-dai; Yuuji Furuto, Nittamae, all of Japan; Bruno Roland, Waverse Baan, and Ria Lombaerts, Kapellelei, both of Belgium, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan and UCB Societe Anonyme, Brussels, Belgium

Filed Nov. 16, 1989, Ser. No. 437,518

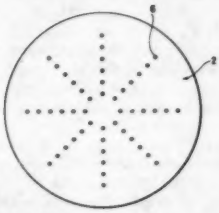
Claims priority, application Japan, Nov. 22, 1988, 63-293633

Int. Cl.[5] B44C *1/22*; C03C *15/00, 25/06*; B29C *37/00*

U.S. Cl. 156—628 **13 Claims**

1. In a method for high temperature reaction process for the treatment of a polymer film on a substrate with a reactive

compound, using a reaction vessel capable of being tightly sealed and equipped with an upper heating plate positioned above said substrate, and a lower heating plate positioned below said substrate, both heating plates being designed to heat said substrate, said method for high temperature reaction process being performed with a temperature difference between a temperature TU° C. of said upper heating plate and a temperature TL° C. of said lower heating plate being maintained so that TU° C. falls in the range of (TL−70) to (TL−30) °C. during the treatment.



4,957,589

PROCESS FOR PRODUCING SECOND HARMONIC WAVE GENERATING DEVICE

Masaya Yamada, Ogaki, Japan, assignor to Ibiden Co., Ltd., Gifu, Japan

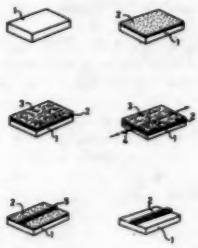
PCT No. PCT/JP88/01214, § 371 Date Jul. 10, 1989, § 102(e) Date Jul. 10, 1989, PCT Pub. No. WO89/05473, PCT Pub. Date Jun. 15, 1989

PCT Filed Nov. 30, 1988, Ser. No. 381,407

Claims priority, application Japan, Nov. 30, 1987, 62-299831

Int. Cl.[5] B44C *1/22*; C23F *1/02*; C03C *15/00, 25/06*

U.S. Cl. 156—643 **11 Claims**



1. A process for producing a second harmonic wave generating device, comprising:

providing a slab-type light waveguide of an optical circuit device, said slab-type light waveguide comprising an optical crystal, said light waveguide having light incident and light exit end surfaces, said end surfaces being polished;

coating a visible light light-sensitive material on said slab-type light waveguide;

permitting a laser beam to be incident on said polished light incident end surface of said light waveguide, and allowing exiting of the light at said polished light exit end surface to effect phase matching, and simultaneously exposing said visible light light-sensitive material with a visible light second harmonic wave which is generated as a result of said phase matching;

developing said visible light light-sensitive material for producing an etching mask;

patterning the light waveguide for the second harmonic wave by an etching treatment of said light waveguide surface using said etching mask; and

removing said visible light light-sensitive material at portions not corresponding to said etching mask, and then removing said etching mask from said light waveguide surface.

4,957,590

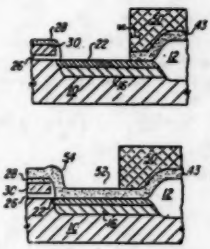
METHOD FOR FORMING LOCAL INTERCONNECTS USING SELECTIVE ANISOTROPY

Monte A. Douglas, Coppell, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation-in-part of Ser. No. 273,287, Nov. 17, 1988, Pat. No. 4,863,559, which is a continuation of Ser. No. 159,282, Feb. 22, 1988, Pat. No. 4,793,896. This application Sep. 5, 1989, Ser. No. 402,944

Int. Cl.[5] B44C *1/22*; C03C *15/00, 25/06*; C23F *1/02*

U.S. Cl. 156—643 **29 Claims**



1. A method for forming a connection of a conductive titanium compound, over a dielectric and a conductor, on a semiconductor surface of a body, comprising:

forming a layer comprising a conductive titanium compound in contact with said conductor and said dielectric, said layer of said conductive titanium compound disposed over a step near said surface;

covering a portion of said conductive titanium compound with photoresist, said portion of said conductive titanium compound disposed over said step not covered by said photoresist; and

exposing said body to a chlorine bearing agent in a plasma reactor to etch said conductive titanium compound from said conductor and said dielectric at locations not covered by said photoresist;

wherein said exposing step substantially removes said conductive titanium compound from the location of said step without substantially removing said conductive titanium compound from under said photoresist.

4,957,591

METHOD FOR PREPARING NEEDLE-LIKE, FIBROUS OR POROUS DIAMOND, OR AN AGGREGATE THEREOF

Yoichiro Sato; Mutsukazu Kamo, both of Tsukuba, and Chiemi Hata, Tachikawa, all of Japan, assignors to National Institute for Research in Inorganic Materials, Tsukuba, Japan

Filed Dec. 9, 1988, Ser. No. 281,650

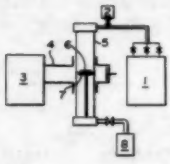
Claims priority, application Japan, Mar. 29, 1988, 63-75161

Int. Cl.[5] B44C *1/22*; C03C *15/00, 25/06*

U.S. Cl. 156—643 **12 Claims**

1. A method for preparing needle-like, fibrous or porous diamond, or an aggregate thereof, which comprises subjecting

diamond synthesized by a chemical vapor deposition method to plasma treatment in a gas stream containing oxygen, carbon



dioxide, steam, hydrogen, a halogenated hydrocarbon or a halogenated carbon, for etching.

4,957,592

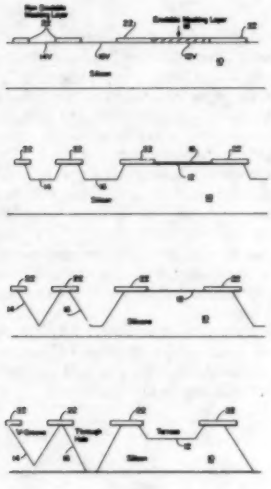
METHOD OF USING ERODABLE MASKS TO PRODUCE PARTIALLY ETCHED STRUCTURES IN ODE WAFER STRUCTURES

James F. O'Neill, Penfield, N.Y., assignor to Xerox Corporation, Rochester, N.Y.

Filed Dec. 27, 1989, Ser. No. 458,182

Int. Cl.[5] H01L *21/306*; **B44C** *1/22*; **C03C** *15/00, 25/06*

U.S. Cl. 156—644 **20 Claims**



1. A method of fabricating an opening in a wafer comprising the steps of:

applying an erodable first mask to a surface of the wafer;

patterning the erodable first mask to define an erodable first mask layer at a desired location for the opening;

applying a second mask layer over the erodable mask layer;

patterning the second mask layer to expose the erodable first mask layer;

anisotropically etching through the first erodable mask layer and into the wafer to form the opening to a desired depth.

4,957,593

MODIFIED COMPOSITE ELECTRODES WITH RENEWABLE SURFACE FOR ELECTROCHEMICAL APPLICATIONS AND METHOD OF MAKING SAME

Brenda R. Shaw, and Kenneth E. Creasy, both of Storrs, Conn., assignors to University of Connecticut, Storrs, Conn.

Filed Mar. 7, 1989, Ser. No. 319,971

Int. Cl.[5] C25B *11/12*

U.S. Cl. 204—291 **11 Claims**

1. A self-supporting renewable modified composite electrode for electrochemical applications comprising a substantially homogenous structure of a composition consisting of:

(a) 1–98 percent by weight of a non-conductive polymeric matrix;

(b) 1–98 percent by weight of a conductive filler dispersed throughout said matrix and sufficient to provide electrical conductivity in the electrode; and

(c) 1–98 percent by weight of a modifier dispersed throughout said matrix, said modifier providing to said electrode electroactive properties, said electrode being homogeneous throughout its cross section and thereby renewable by removal of a surface portion thereof to expose a fresh portion thereof.

4,957,594

PROCESS FOR PRODUCING A ZINC OR ZINC ALLOY COATED STEEL SHEET HAVING EXCELLENT SPOT WELDABILITY

Kazumasa Yamazaki; Yaichiro Mizuyama; Takashi Horita, and Shinichi Suzuki, all of Tokai, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Feb. 13, 1989, Ser. No. 309,260

Claims priority, application Japan, Feb. 19, 1988, 63-35034; Aug. 9, 1988, 63-197260; Sep. 22, 1988, 63-236238

Int. Cl.[5] C25D *5/00, 9/08*

U.S. Cl. 204—27 **4 Claims**

1. A process for producing a zinc- or zinc alloy-coated steel sheet having an excellent spot-weldability comprising the steps of:

coating a steel sheet with one or more layers wherein, at least one of said coated layers contains zinc as a major component, and

depositing zinc on the outermost of said coated layers with a simultaneous oxidation of zinc deposited by an electrogalvanizing treatment in a plating bath containing zinc ions and 0.5 to 30% of hydrogen peroxide to form an oxidized layer on the outermost of said coated layers in an amount of from 0.03 to 3.0 g/m^2 in terms of the zinc content of said oxidized layer, said oxidized layer containing at least one of zinc oxide and zinc hydroxide.

2. A process for producing a zinc- or zinc alloy-coated steel having an excellent spot-weldability, comprising the steps of:

coating a steel sheet with one or more layers wherein, at least one of said coated layers contains zinc as a major component, and

depositing zinc on the outermost of said coated layers with a simultaneous oxidation of zinc deposited by electrolysis using said steel sheet as a cathode in an acidic bath containing zinc ions and one or more oxidizing agents selected from the group consisting of nitric acid and nitrates to form an oxidized layer on the outermost of said coated layers in an amount of from 0.03 to 3.0 g/m^2 in terms of the zinc content of said oxidized layer, said oxidized layer containing at least one of zinc oxide and zinc hydroxide.

3. A process for producing a zinc- or zinc alloy-coated steel sheet having an excellent spot-weldability, comprising the steps of:

coating a steel sheet with one or more layers wherein, at least one of said coated layers contains zinc as a major component, and

depositing zinc on the outermost of said coated layers with a simultaneous oxidation of zinc deposited by contacting with a solution containing zinc ions and one or more

oxidizing agents selected from the group consisting of nitric acid and nitrates to form an oxidized layer on the outermost of said coated layers in an amount of from 0.03 to 3.0 g/m^2 in terms of the zinc content of said oxidized layer, said oxidized layer containing at least one of zinc oxide and zinc hydroxide.

4,957,595

SEPARATION OF 3-METHYL-2-BUTANONE FROM FORMIC ACID BY EXTRACTIVE DISTILLATION WITH SULFOLANE

Lloyd Berg, 1314 S. 3rd Ave., and George Bentu, both of Bozeman, Mont. 59715, assignors to Lloyd Berg, Bozeman, Mont.

Filed Nov. 7, 1989, Ser. No. 432,864

The portion of the term of this patent subsequent to Aug. 14, 2007, has been disclaimed.

Int. Cl.[5] B01D *3/40*; C07C *45/83, 51/44*

U.S. Cl. 203—51 **1 Claim**

1. A method for recovering 3-methyl-2-butanone from a mixture consisting essentially of 3-methyl-2-butanone and formic acid which comprises distilling the mixture consisting essentially of 3-methyl-2-butanone and formic acid in a rectification column in the presence of about one part of an extractive agent per part of 3-methyl-2-butanone-formic acid mixture, recovering 3-methyl-2-butanone as overhead product and obtaining the extractive agent and the formic acid from the stillpot, wherein said extractive agent comprises sulfolane and at least one material selected from the group consisting of adipic acid, azelaic acid, benzoic acid, cinnamic acid, p-tert. butyl benzoic acid, decanoic acid, ethylene glycol diacetate, glycerine triacetate, hexanoic acid, p-hydroxy benzoic acid, itaconic acid, malic acid, neodecanoic acid, m-nitrobenzoic acid, octanoic acid, isobutyl heptyl ketone, cyclohexanone, dipropylene glycol dibenzoate, diethylene glycol dimethyl ether, 2-methoxyethyl ether, glutaric acid, butyl benzoate, ethyl benzoate, methyl benzoate, 3-heptanone, diethylene glycol diethyl ether, isophorone, 4-methyl-2-pentanone, pelargonic acid, benzyl benzoate, phenyl acetate, anisole and ethylene glycol phenyl ether.

4,957,596

PROCESS FOR PRODUCING COKE

Keizoo Ukita, Yokohama; Tetsuo Hamaguchi, Chigasaki, and Masaaki Inoue, Yokohama, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

Filed Jun. 15, 1989, Ser. No. 366,548

Claims priority, application Japan, Jun. 17, 1988, 63-149471

Int. Cl.[5] C10B *57/06*

U.S. Cl. 201—20 **11 Claims**

1. In a process for producing coke by carbonization of a starting coal, the improvement which comprises carbonizing a starting coal containing a bulk density improving effective amount of a bulk density improving agent comprising a water-insoluble synthetic resin having a high molecular network three-dimensionally crosslinked physically or chemically and capable of absorbing or adsorbing distilled water in an amount of 5 to 1000 times its own weight and capable of forming a hydrous gel in the presence of moisture.

4,957,597

CONVEYOR BELT FOR TURN CONVEYORS

Guy L. Irwin, Oreland, Pa., assignor to I. J. White Co., Farmingdale, N.Y.

Filed Sep. 20, 1989, Ser. No. 409,691

Int. Cl.[5] B65G *15/02*

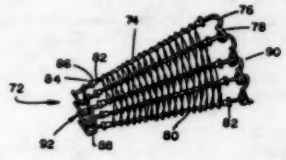
U.S. Cl. 198—831 **13 Claims**

1. A fixed radius turn conveyor belt comprising:

a radially positioned plurality of spaced rods, said rods having inside and outside ends, said ends forming inside and outside edges, wherein a radius of said inside edge is less than a radius of said outside edge;

filaments over at least some adjacent ones of said rods covering spaces between said rods;

links attached to said rods adjacent said inside ends, said links defining a position of said filaments relative to said inside edge, said links being effective to interact with a sprocket wheel driving said belt;



wherein said outside ends are bent to movably connect said rods with each other, and said inside ends are straight and movably connected to each other by said links; and

retainers on said rods adjacent to said outside ends, said retainers defining a position of said filaments relative to said outside edge.

4,957,598

SUCTION BOX COVER WITH MODULAR COMPONENTS

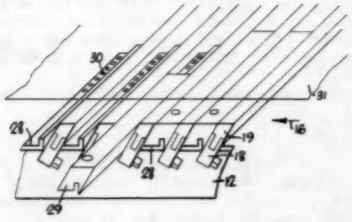
Glauco Corbellini, 33100 Via Carducci 48, Udine, Italy

Filed Mar. 21, 1989, Ser. No. 326,384

Claims priority, application Italy, Mar. 29, 1988, 83354 A/88

Int. Cl.[5] D21F *1/52*

U.S. Cl. 162—363 **9 Claims**



1. A modular-type suction box cover having sides for supporting a wire for paper mill stock, and comprising; a frame structure including external side beams, a plurality of sliding blades including a front sliding blade, intermediate sliding blades, and a subsequent sliding blade, each blades being constructed of a carrier connected to a sliding body which contacts the wire, said blades being a sliding surface for said wire, and are supported from a plurality of shaped staffs, each shaped staff having a plurality of inclined slots, each inclined slot having a single sliding blade lodged therein, and having a small notch intersecting said slot and cooperatively associated with elastic fastening means for clamping and forcing said blade against said shaped staff, each blades being at right angles to said shaped staffs, and each said shaped staff standing the distance between and connecting said external side beams, said cover being sealed at the sides by seals and is secured by means of said beams to a lower suction box, and elastic fastening means between the intermediate sliding blades and said shaped staff, fastening means between the front sliding blade with one of said side beams, fastening means between the subsequent sliding blade with another of said side beams, fastening means between the shaped staffs with said side beams, and fastening means between the side beams with said lower suction box, all

said fastening means being releasable so that such components of said suction box cover which are modular in form may be readily assembled to and disassembled from the lower suction box for ease of repair and replacement of parts.

4,957,599

ALKALINE EXTRACTION, PEROXIDE BLEACHING OF NONWOODY LIGNOCELLULOSIC SUBSTRATES

Yu-Chia T. Chou, Wilmington, Del.; David F. Garrison, Mullica Hill, N.J., and William I. Lewis, Burlington, Canada, assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 181,774, Apr. 15, 1988, abandoned. This application Dec. 8, 1989, Ser. No. 450,908

Int. Cl.[5] D21C *3/02*

U.S. Cl. 162—78 **20 Claims**

1. An improved process for converting nonwoody lignocellulosic substrates into products digestible by ruminants and ingestible by humans comprising the following steps:

(a) forming a slurry of the substrate with aqueous alkali in an amount at least sufficient to uniformly wet the substrate, the alkali present in an amount greater than about 1 percent (calculated as sodium hydroxide) of the dry weight of the substrate, the slurry being substantially free of peroxide;

(b) maintaining the slurry of step (a) for a sufficient time depending on the substrate, the temperature, the alkali concentration and mixing efficiency, the temperature being about 25° to 100° C. for the alkali to uniformly wet the substrate;

(c) separating the wetted substrate from the aqueous alkali in the slurry; then

(d) forming a slurry of the wetted substrate in an alkaline peroxide solution containing about 1 to 15 wt. % peroxide based on the original dry weight of the substrate at a temperature of about 25° to 90° C. and an initial pH of about 8.5 to 11.0;

(e) maintaining the slurry of step (d) for a time sufficient to produce a substantially bleached, cellulosic fiber that is sufficiently delignified to expose substantially all the cellulosic and hemicellulosic components to facilitate its intended use; and

(f) separating the bleached fiber from the alkaline peroxide.

4,957,600

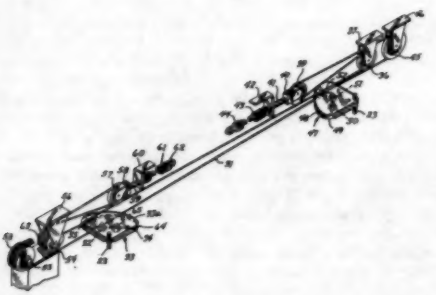
BI-FOLD DOOR CONSTRUCTION

Dennis L. Carlson, and Richard D. Cultice, Jr., both of Waukesha, Wis., assignors to Kelly Company Inc., Milwaukee, Wis.

Filed Jun. 26, 1989, Ser. No. 371,265

Int. Cl.[5] E05D *15/26*

U.S. Cl. 160—199 **15 Claims**



1. An industrial door to enclose a doorway in a building, comprising a pair of side panels, means for pivotally connecting one side edge of each side panel to a side of the doorway, a pair of center panels, a side edge of each center panel being disposed adjacent a second side edge of a side panel, a track extending along the upper end of the doorway, a pair of trolley means disposed to ride on the track, the upper edge of each center panel being connected to one of said trolley means and mounted for rotation relative to said trolley means about a vertical pivot axis, drive means for moving said trolley means on said track and simultaneously pivoting said panels about the respective axes to thereby move the panels between a folded open position and a closed position where said panels enclose said doorway, said drive means comprising reversible power operated means and a cable operable connected to said power operating means, a torque arm extending outwardly from the axis of each trolley means, said cable being connected to each torque arm at a location spaced from the respective axis, each torque arm being generally quadrant-shaped and each torque arm including a curved surface, said cable disposed on said curved surface, said cable means being reeved to effect movement of said trolley means in opposite directions on said track and simultaneously pivot said torque arms about the respective axes to move the panels between the open and closed positions.

4,957,601

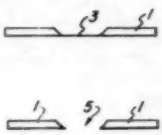
METHOD OF FORMING AN ARRAY OF APERTURES IN AN ALUMINUM FOIL

Jules D. Levine, Dallas, and Millard J. Jensen, Balch Springs, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 647,600, Sep. 4, 1984, abandoned. This application May 8, 1989, Ser. No. 351,256

Int. Cl.[5] B44C *01/22*

U.S. Cl. 156—665 **14 Claims**



1. A method of forming an array of apertures through an aluminum foil for use in fabrication of solar cells, comprising the steps of:

(a) providing a flexible aluminum foil having a thin oxide on the surface thereof,

(b) embossing said foil at predetermined spaced unconnected locations to provide regions of reduced thickness in said foil at the locations of said embossments, and

(c) etching without protective coating said aluminum foil along an entire unmasked surface of said foil to remove said regions of reduced thickness to provide apertures through said foil at said regions of reduced thickness.

4,957,602

METHOD OF MODIFYING THE DIELECTRIC PROPERTIES OF AN ORGANIC POLYMER FILM

Michael Binder, Brooklyn, N.Y., and Robert J. Mammone, South Plainfield, N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jun. 12, 1989, Ser. No. 374,125

Int. Cl.[5] C23C *14/48*

U.S. Cl. 204—192.31 **3 Claims**

1. Method of modifying the dielectric properties of a vapor deposited thin film of a poly-p-xylylene comprising irradiating the vapor deposited thin film of a poly-p-xylylene with doses of ions.

4,957,603

OPTICAL MEMORY DISC MANUFACTURE

Michael E. Hennessey, Detroit, Mich., assignor to Producers Color Service, Inc., Southfield, Mich.

Filed Oct. 23, 1989, Ser. No. 425,285
Int. Cl.[5] C23C *14/34*
U.S. Cl. 204—192.27 6 Claims

1. In a process for manufacture of an optical memory disc that includes the steps of providing a PMMA disc substrate having an integral surface with information recorded thereon as a series of surface undulations, and sputter depositing a film of optically reflective metallic construction onto said surface such that said information recorded on said surface is adapted to be optically read through said substrate as a function of changes in effective reflectively from said film caused by said surface undulations,

a method of improving adhesion between said film and said substrate comprising the steps of: (a) modifying said substrate surface by subjecting said surface to radiation in the presence of carbon at said surface, in excess of that in the surface PMMA molecular structure, as a pretreatment to said surface before sputter deposition of said metallic film so as to alter effects of degradation and depolymerization at said surface due to radiation during said sputter deposition and chemically prepare degraded and depolymerized molecules at said surface for bonding said film to that portion of said substrate underlying said surface, and (b) sputtering said metal film directly onto the substrate surface chemically modified in said step (a) so as to form a layered substrate/film structure that consists essentially of said reflective metallic film, said underlying substrate and said chemically modified substrate surface bonding said film to said underlying substrate.

4,957,604

PRODUCTION OF A THIN X-RAY AMORPHOUS ALUMINUM NITRIDE OR ALUMINUM SILICON NITRIDE FILM ON A SURFACE

Helmut Steininger, Worms, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jan. 24, 1989, Ser. No. 300,975
Claims priority, application Fed. Rep. of Germany, Feb. 2, 1988, 3802998
Int. Cl.[5] C23C *14/34*
U.S. Cl. 204—192.16 13 Claims

1. A process for the production of a thin X-ray amorphous aluminum nitride film on a surface, comprising the following steps in the stated order:

(1) production of a sputter gas by vaporization of aluminum by reactive sputtering or reactive magnetron sputtering under reduced pressure in a process gas atmosphere consisting essentially of nitrogen and argon and one or more further noble gases selected from the group consisting of neon, krypton and xenon, the volume ratio of argon to the further noble gases being from 2:1 to 100:1 and the volume ratio of the further noble gases to nitrogen being from 2:1 to 10:1, so that the sputter gas results, and

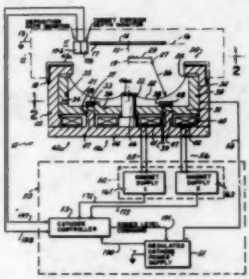
(2) deposition of the aluminum nitride from the sputter gas onto the surface, resulting in the thin X-ray amorphous aluminum nitride film.

4,957,605

METHOD AND APPARATUS FOR SPUTTER COATING STEPPED WAFERS

Steven D. Hurwitt, Park Ridge, N.J.; Israel Wagner, Monsey, N.Y.; Robert Hieronymi, Rock Cavern, N.Y., and Charles Van Nutt, Monroe, N.Y., assignors to Materials Research Corporation, Orangeburg, N.Y.

Filed Apr. 17, 1989, Ser. No. 339,308
Int. Cl.[5] C23C *14/35*
U.S. Cl. 204—192.12 120 Claims



73. A method of depositing a desired distribution of sputtered material across the surface of a substrate and for controlling the deposition rate from different regions of a single-piece sputtering target which erode at different rates, said method comprising the steps of:

providing a one piece sputtering target and defining a plurality of differently facing regions thereon, including a first region and a second region;

establishing separate values for electrical parameters for each of said regions so as to cause the deposition of the sum of material sputtered from all of said regions to be of a desired distribution across the substrate surfaces;

activating a first plasma supporting magnetic field adjacent said first target region so as to cause the emission of sputtered material, and the erosion of said target, in said first target region when said target is energized;

energizing said target in accordance with the electrical parameter values established for said first target region while said first magnetic field is activated and other magnetic fields are deactivated;

activating a second plasma supporting magnetic field adjacent said second target region so as to cause the emission of sputtered material, and the erosion of said target, in said second region when said target is energized; and

energizing said target in accordance with the electrical parameter values established for said second target region while said second field is activated and other magnetic fields are deactivated.

4,957,606

SEPARATION OF DISSOLVED AND UNDISSOLVED SUBSTANCES FROM LIQUIDS USING HIGH ENERGY DISCHARGE INITIATED SHOCK WAVES

Christian H. A. Juvan, 10053 Judy Ave., Cupertino, Calif. 95014

Continuation-in-part of Ser. No. 78,655, Jul. 28, 1987, Pat. No. 4,917,785. This application Aug. 31, 1988, Ser. No. 239,184
Int. Cl.[5] B01J *3/08, 19/08*
U.S. Cl. 204—164 24 Claims

1. A method for removing a dissolved organic liquid from a liquid solution with water, comprising,

introducing a quantity of the liquid solution into a firing chamber,

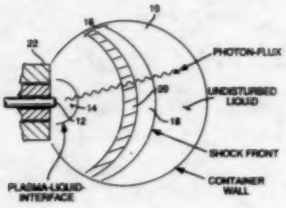
discharging an electrical current across electrodes in the firing chamber, in a sudden, high-energy discharge

wherein the current arcs across the electrodes, causing a shock wave accompanied by high turbulence to be produced and to move through the liquid solution in the firing chamber, accompanied by high intensity electro-magnetic radiation which travels through the liquid solution,

thereby causing the dissolved organic liquid to be at least partially ionized and to react with oxygen present to be converted to water and gases, and

venting the gases from the water.

4. A method for removing a dissolved organic liquid from a liquid solution with water, comprising,



introducing a quantity of the liquid solution into a firing chamber of substantially confined volume,

discharging a high energy pulse, in the range of microseconds in length, into the liquid solution, causing a shock wave accompanied by high turbulence to be produced and to move through the liquid solution in the firing chamber, accompanied by high intensity electro-magnetic radiation which travels through the liquid solution,

thereby causing the dissolved organic liquid to be at least partially ionized and to react with oxygen present to be converted into water and gases, and

venting the gases from the water.

4,957,607

METHOD FOR THE PREPARATION OF A CYCLOALKYL SILANE COMPOUND

Mikio Endo, Niigata; Minoru Takamizawa, Moogata; Toshinobu Ishihara; Tohru Kubota, both of Niigata, and Toshio Shinohara, Gumma, all of Japan, assignors to Shin Etsu Chemical Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 154,691, Feb. 11, 1988, Pat. No. 4,883,569. This application Jul. 17, 1989, Ser. No. 380,350

Claims priority, application Japan, Feb. 13, 1987, 62-30994

The portion of the term of this patent subsequent to Nov. 28, 2006, has been disclaimed.

Int. Cl.[5] B01J *19/08*

U.S. Cl. 204—157.74 **9 Claims**

1. A method for the preparation of a cycloalkyl silane compound which comprises the steps of:

(A) admixing an unsaturated cyclic hydrocarbon compound represented by the general formula

$$C_mR^1_nA_p$$

in which R^1 is a hydrogen atom, a fluorine atom or a flourine-substituted or unsubstituted monovalent hydrocarbon group having 1 to 8 carbon atoms, A is a divalent intramolecular bridging group selected from methylene group $>CH_2$ and dimethylmethylene group $>C(CH_3)_2$, m is an integer of 4 to 8, p is zero or 1 and n is an integer given by the equation $n=2m-2p-2$, with a hydrogen silane compound represented by the general formula

$$HR^2_qSiX_{3-q}$$

in which R^2 is an unsubstituted or substituted monovalent hydrocarbon group, X is a halogen atom or an alkoxy group and q is zero, 1 or 2, and an alcoholic complex of chloroplatinic acid prepared by heating chloroplatinic acid in an alcohol at a temperature in the range from 50° to 80° C. for at least 4 hours to form an alcohol complex thereof; and

(B) irradiating the reaction mixture with ultraviolet light to effect the hydrosilylation reaction between the unsaturated cyclic hydrocarbon compound and the hydrogen silane compound.

4,957,608

PREPARATION OF 8-BROMOMETHYL-3-METHYLQUINOLINE COMPOUNDS

Helmut Hagen, Frankenthal; Rolf-Dieter Kohler, Edingen-Neckarhausen, and Jacques Dupuis, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

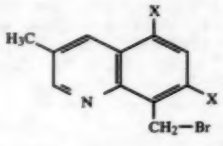
Division of Ser. No. 146,691, Jan. 21, 1988. This application Jun. 5, 1989, Ser. No. 361,504

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1987, 3703113

Int. Cl.[5] C07D *215/18*; B01J *19/12*

U.S. Cl. 204—157.71 **9 Claims**

1. A process for the production of 8-bromomethyl-3-methylquinoline compounds of the formula I



I

where the two radicals X denote chlorine or one of them denotes chlorine and the other hydrogen, which process comprises: reacting a corresponding 8-methylquinoline with bromine at a reaction-effective temperature in the presence of light having a sufficiently short wave length to initiate the reaction and in a reaction medium consisting essentially of an aqueous phase buffered at a pH of essentially 3–6 and an organic phase comprising a water-insoluble inert solvent which is stable to bromination.

4,957,609

PROCESS FOR PREPARING N-HETEROCYCLIC COMPOUNDS

Neil Godfrey, Stevenage; Ian H. Coates, Hertford; James A. Bell, Ware; David C. Humber, Ealing, and George B. Ewan, Chalfont St. Peter, all of England, assignors to Glaxo Group Limited, London, England

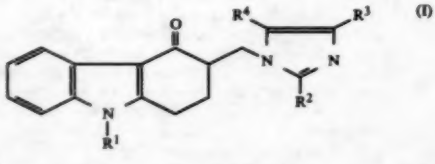
Continuation of Ser. No. 888,256, Jul. 23, 1986, abandoned. This application Feb. 21, 1989, Ser. No. 312,172

Claims priority, application United Kingdom, Jul. 24, 1985, 8518742

Int. Cl.[5] C07D *403/00, 209/82, 209/86*

U.S. Cl. 204—157.71 **10 Claims**

1. A process for the preparation of a compound of formula (I)



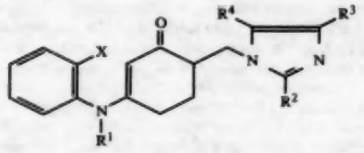
(I)

wherein

R^1 represents a hydrogen atom or a C_{1-10} alkyl, C_{3-7} cycloa-

kyl, C_{3-7} cycloalkyl-(C_{1-4}) alkyl, C_{3-6} alkenyl, C_{3-10} alkynyl, phenyl or phenyl-(C_{1-3}) alkyl group, and one of the groups represented by R^2, R^3, and R_4 is a hydrogen atom or a C_{1-6} alkyl, C_{3-7} cycloalkyl, C_{2-6} alkenyl or phenyl-(C_{1-3}) alkyl group and each of the other two groups, which may be the same or different, represents a hydrogen atom or a C_{1-6} alkyl group;

or a salt or protected derivative thereof which comprises the step of cyclisation of a compound of formula (II)



(II)

wherein X represents a hydrogen atom or a halogen atom and R^1, R^2, R^3 and R^4 are as defined above, or a salt or a protected derivative thereof, and wherein the cyclisation is carried out in the presence of a palladium reagent or, alternatively, where X represents a halogen atom, the cyclisation may be carried out in the presence of a copper (I) salt or photochemically.

4,957,610

GENERATION OF HYDROGEN AND OXYGEN

James T. Hawkins, 2620 Downing Ave., Cincinnati, Ohio 45208

Filed Jan. 30, 1989, Ser. No. 303,115
Int. Cl.[5] C25C 1/02
U.S. Cl. 204—129 **13 Claims**

1. A method of generating hydrogen and oxygen, comprising the steps of:

providing a reactor vessel having first and second chambers;

placing an electrolytic solution in the first and second chambers;

placing an anode in the first chamber and a cathode in the second chamber;

connecting the anode and the cathode electrically;

producing a solar-induced laser beam by directing sunlight onto a solar-pumped laser;

multiplying the frequency of the laser beam to the ultraviolet frequency; and

directing the frequency-multiplied ultraviolet light onto the anode and the cathode where oxygen is produced at the anode and hydrogen is produced at the cathode.

4,957,611

PROCESS AND APPARATUS FOR THE ELECTRO-DEPOSITION OF COPPER SHEETS ON THE CATHODIC SIDES OF BIPOLAR ELECTRODES MADE OF LEAD

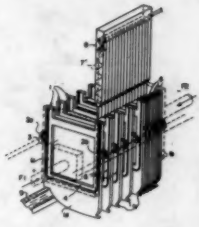
Rinetto Collini, c/o Flammenghi Flammenghi Via Quattro Fontane 31, I 00184 Roma, Italy

Filed Dec. 1, 1988, Ser. No. 305,990
Claims priority, application Italy, Jun. 6, 1986, 48112 A/86
Int. Cl.[5] C25C 1/12, 7/00, 7/06
U.S. Cl. 204—106 **7 Claims**

1. An electrolytic process for the electrodeposition of removable copper sheets on the cathodic surfaces of bipolar lead sheet electrodes, each of said electrodes having an anodic surface directly opposite the cathodic surface thereof, said electrodes being immersed in an aqueous electrolytic solution of copper sulphate acidified by sulphuric acid, said lead sheet electrodes being arranged in series electrically with the first and last electrode in the series being connected between an electrical current source, said process including the following steps:

forming a plurality of separate similar electrolytic cells by installing each of the lead sheet electrodes in a separate modular carrying frame of a corrosion resistant and electrically non-conductive material, said frames being arranged side by side and connected together to form an integral assembly,

continuously flowing said aqueous electrolytic solution from a distribution source thereof independently and separately through each of said cells in a flow path entering at the bottom of each cell, flowing through a discharge hole in



the upper part of each cell which also provides the discharge of oxygen to the atmosphere, and then flowing downwardly through an outlet orifice back to the distribution source, said solution being flowed through flow breaking means located in the flow path for creating discontinuities in the flow so as to prevent the formation of shunt currents or current bypasses along the flow path.

4,957,612

ELECTRODES FOR USE IN ELECTROCHEMICAL PROCESSES

Ray F. Stewart, Redwood City, and James C. Thompson, Los Altos, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Filed Feb. 9, 1987, Ser. No. 12,394
Int. Cl.[5] C23F 13/16
U.S. Cl. 204—196 **16 Claims**

1. An elongate article which is suitable for use as a distributed electrode in an electrochemical process and which comprises

(a) an elongate core which (i) is composed of a first conductive material having a first resistivity at 23°C., and (ii) does not provide any part of the electrochemically active surface of the electrode;

(b) an elongate intermediate element which (i) is secured to and electrically surrounds the core, (ii) is composed of a second conductive material which is a conductive polymer and which has a second resistivity at 23° C., the second resistivity being at least 1200 ohm.cm and being higher than the first resistivity, (iii) does not provide any part of the electrochemically active surface of the electrode, and (iv) has a transverse resistance of at least 1 ohm.meter; and

(c) at least one outer element which (i) is secured to and is in electrical contact with the core and the intermediate element so that all electrical paths between the core and the outer element pass through the intermediate element, (ii) is composed of a third conductive material which is a conductive polymer and which has a third resistivity of 23° C., the third resistivity being 0.01 to 300 ohm.cm, and (iii) provides at least part of the electrochemically active surface of the electrode.

4,957,613

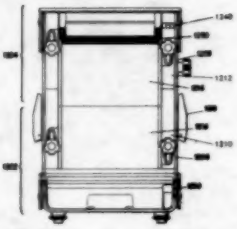
ADJUSTABLE-HEIGHT VERTICAL GEL SLAB ELECTROPHORESIS APPARATUS

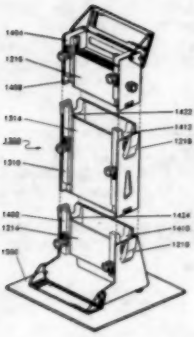
Michael Schuette, Vienna, Va., assignor to Life Technologies Inc., Gaithersburg, Md.

Continuation-in-part of Ser. No. 9,708, Feb. 2, 1987, Pat. No. 4,773,984. This application Sep. 23, 1988, Ser. No. 248,196

Int. Cl.[5] G01N *27/28, 27/26;* B01D *57/02*

U.S. Cl. 204—299 R **21 Claims**





1. An adjustable-height vertical electrophoresis apparatus for use in performing electrophoresis procedures of the type in which a gel slab is maintained in a substantially vertical orientation, and adapted for use with an electrical source, which apparatus comprises:

an electrophoresis gel slab mold, having a top and a bottom and defining a region shaped to contain a gel slab placed within it;

a frame for maintaining said electrophoresis gel slab mold and thereby any gel slab contained within in a substantially vertical position, said frame comprising an upper portion having lower edges and a lower portion, separable from said upper portion but having upper edges matching respective ones of said lower edges of said upper portion to substantially prevent wobbling or tilting of said upper portion when said upper portion is placed atop said lower portion and said frame formed thereby is vertically oriented;

a first buffer reservoir in said upper portion of said frame, located adjacent said top of said electrophoresis gel slab mold, a first electrode located in said first buffer reservoir and adapted to be connected to the electrical source, said first buffer reservoir being adapted to contain in its interior a first buffer solution in effective electrical contact with said first electrode and with an uppermost end of a gel slab contained within said electrophoresis gel slab mold;

a second buffer reservoir in said lower portion of said frame, located adjacent said bottom of said electrophoresis gel slab mold, and a second electrode located in said second buffer reservoir and adapted to be connected to the electrical source, said second buffer reservoir being adapted to contain in its interior a second buffer solution in effective electrical contact with said second electrode and with a lowermost end of a gel slab contained within said electrophoresis gel slab mold;

means including said first and second electrodes electrically connecting said first and said second buffer solutions for applying an electrical potential across a gel slab contained within said electrophoresis gel slab mold; and

a lower buffer reservoir tray located in said lower portion of said frame, and having at least two containers, a lower buffer reservoir container and an upper buffer reservoir drain container, said lower buffer reservoir container acting said second buffer reservoir, and said upper buffer reservoir drain container adapted to receive said first buffer solution through a drainage pathway connecting said first reservoir with said upper buffer reservoir drain container.

4,957,614

ELECTROCHEMICAL DETECTION DEVICE

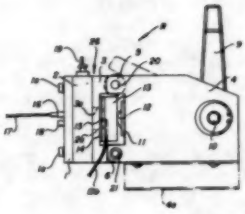
Hideo Matsumura, Nara; Hirohito Nishino, Kusatsu; Hidetoshi Fukuyama, Joyo; Kazutoshi Yamazaki, Otsu, and Hiromitsu Suzuki, Ibaraki, all of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Feb. 19, 1988, Ser. No. 157,564

Claims priority, application Japan, Feb. 20, 1987, 62-24833[U]; Feb. 20, 1987, 62-40531

Int. Cl.[5] G01N *27/28*

U.S. Cl. 204—411 **9 Claims**

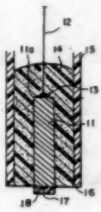


1. An electrochemical detection device comprising as one piece, a cell unit and a supporter; said cell unit comprising a cell block, gasket and working electrode, wherein said cell block contains a test solution introduction means and a test solution outlet means having a test solution outlet route both being substantially normal to the working electrode, through which the test solution flows following introduction thereof into the cell block, and reference and counter electrodes adapted to be in contact with said test solution after introduction thereof, said gasket containing an opening defining the cell which communicates with the test solution introduction and outlet means and communicating with the working electrode; said supporter containing a pressure means adapted to push the working electrode first against the gasket and then onto the cell block, and also adapted to retract the working electrode from the cell block, wherein said pressure means comprises a ball, a spring inside a sleeve horizontally disposed within said supporter, and an electrode-pushing plate disposed between the ball and the working electrode whereby upon movement of the ball, the electrode-pushing plate comes into contact with said working electrode.

4,957,615
OXYGEN SENSOR

Norihiko Ushizawa, Fujinomiyashi, and Takeshi Shimomura, Fujinomiya, both of Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 8,365, Jan. 29, 1987, abandoned. This application Aug. 4, 1988, Ser. No. 228,231
Claims priority, application Japan, Feb. 4, 1986, 61-22509
The portion of the term of this patent subsequent to Aug. 29, 2006, has been disclaimed.
Int. Cl.[5] G01N *27/31*
U.S. Cl. 204—415 8 Claims

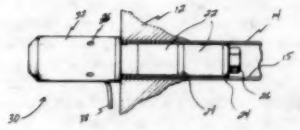


1. An oxygen sensor comprising:
an electrically conductive substrate whose potentiometric response is substantially unaffected by the presence of oxygen gas; and
an electrolytic oxidative polymeric membrane adherently and substantially uniformly coating a surface of said electrically conductive substrate, said electrolytic oxidative polymeric membrane being formed by electrolytic polymerization and comprising at least one substance selected from porphyrin compounds and metal complexes thereof.

4,957,616
TUBE SHEET WITH REFERENCE ELECTRODE

Frank Ansuini, Lincoln, R.I., and Paul Fulford, Jupiter, Fla., assignors to Electrochemical Devices, Inc., Albion, R.I.

Continuation of Ser. No. 277,490, Nov. 29, 1988, abandoned, which is a continuation of Ser. No. 30,876, Mar. 26, 1987, abandoned. This application Dec. 12, 1989, Ser. No. 453,131
Int. Cl.[5] G01M *27/30*; C23F *13/00*; F28F *19/00*
U.S. Cl. 204—435 23 Claims



1. A tube sheet for a shell and tube heat exchanger or condenser, comprising:
a perforated sheet having a waterbox side and a shell side;
a plurality of tubes each having an inside diameter, wherein said tubes are inserted through the perforations in said perforated sheet and extend on the shell side of said perforated sheet; and
a reference electrode apparatus adapted to be installed from the waterbox side of the perforated sheet for use on the waterbox side of said perforated sheet, including
means plugging one of said plurality of tubes at the end of said tube located proximal to said perforated sheet, said plugging means including a sealing means positioned within said tube and having an outer diameter approximately equal to the inside diameter of said tube, and a connecting means extending from said tube,
a reference electrode attached to said connecting means, said reference electrode including means for referencing electrical potential measurements, a housing surrounding said referencing means, and means securing said housing to said connecting means, and
a lead wire extending from said reference electrode on the waterbox side of said perforated tube sheet.

4,957,617
FLUID CATALYTIC CRACKING

Hartley Owen, Belle Mead, N.J., and Paul H. Schipper, Wilmington, Del., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 202,843, Jun. 6, 1988, and a continuation-in-part of Ser. No. 271,803, Nov. 15, 1988, said Ser. No. 202,843, is a division of Ser. No. 903,314, Sep. 3, 1986, Pat. No. 4,749,470, said Ser. No. 271,803, is a division of Ser. No. 903,367, Sep. 3, 1986, Pat. No. 4,787,967. This application Jan. 5, 1989, Ser. No. 293,723
Int. Cl.[5] C10G *11/05*
U.S. Cl. 208—113 22 Claims

1. In a fluid catalytic cracking process undertaken in a vertical riser which includes a feed inlet, a catalytic inlet, and product outlet, the improvement comprising increasing olefin products at the expense of coke production by introducing a cracking catalyst at the catalyst inlet, said cracking catalyst comprising at least one component selected from the group consisting of an amorphous porous silica-alumina and crystalline porous silicate exhibiting an X-ray diffraction pattern of a large pore zeolite;
introducing a lift medium at said catalyst inlet to effect a catalyst suspension with an initial vertical velocity ranging from 20 ft./second to 50 ft./second wherein said lift medium is selected from the groups consisting of C_1–C_5 paraffins, olefins hydrogen, and admixtures thereof;
passing the catalyst suspension through the riser;
creating a pressure drop within the riser downstream of said catalyst inlet to accelerate a feed to a second velocity up through the riser which exceeds said initial vertical;
passing said feed, which is a hydrocarbon petroleum fraction having an initial boiling point of at least 400° F. a 50% of said feed having a boiling point of at least 500° F. and said feed having end point of at least 600° F., at said second velocity through the riser whereby
said feed is contacted with said catalyst for less than one second at a temperature of at least about 1100° F., and
product gasoline is separated from said catalyst suspension within one second of said contact.

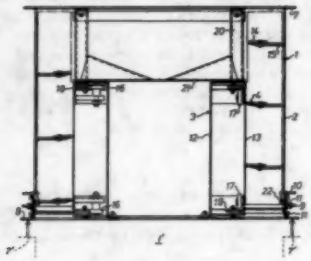
4,957,618
VERTICAL SCREENING DEVICE

Ingmar Andren, Lindesberg, Sweden, assignor to Lindema Kommanditbolag, Lindesberg, Sweden

PCT No. PCT/SE87/00466, § 371 Date Apr. 7, 1989, § 102(e) Date Apr. 7, 1989, PCT Pub. No. WO88/03061, PCT Pub. Date May 5, 1988
PCT Filed Oct. 14, 1987, Ser. No. 347,046
Claims priority, application Sweden, Oct. 22, 1986, 8604513
Int. Cl.[5] B07B *1/22*
U.S. Cl. 209—303 10 Claims

1. A vertical screening device, comprising a vertical cylinder screen, a vertical feed screw received in said cylinder screen and cooperating with an interior surface thereof, bearing means received in said feed screw for supporting said feed screw, said bearing means being rotatable on a vertical axis of

said cylinder screen and fixedly connected to said cylinder screen, and connecting means including a link connecting said



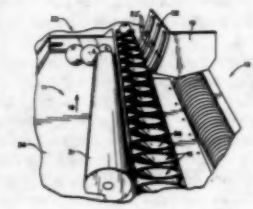
feed screw to a fixed point outside said cylinder screen for holding said feed screw stationary.

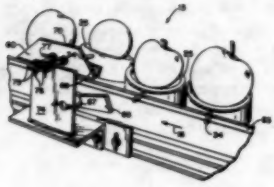
4,957,619

SELF-SINGULATING WEIGHT SIZER

Harry C. Powell, Jr., Faber, Va., assignor to Powell Machinery, Inc., Faber, Va.

Filed Sep. 23, 1988, Ser. No. 248,199
Int. Cl.[5] B07C *5/02, 5/16*
U.S. Cl. 209—539 22 Claims





1. An article sorter for sorting discrete bruisable articles, comprising:

a continuous conveying chain elongated in a dimension of elongation;

a plurality of discrete article supporting elements connected to said chain for linear movement therewith and pivotal movement with respect thereto;

a plurality of stations for said continuous conveying chain and article supporting elements including: (a) a self-singulating section in which the articles are singulated onto the supporting elements, (b) an article property determining section through which the articles are carried by said supporting elements and properties thereof sensed, and (c) a discharge section in which the articles are selectively discharged at a plurality of spaced distinct locations depending upon the properties thereof sensed in said article property determining section; and

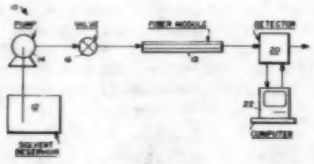
wherein said section (a) comprises a feed conveyor disposed at an angle with respect to said dimension of elongation and on one side of said article supporting elements, and a cushioning backstop disposed on the opposite side of said supporting elements from said feed conveyor, and an overflow region for allowing articles not singulated onto said supporting elements to move off of said elements and said chain and to be ultimately returned to said feed conveyor.

4,957,620

LIQUID CHROMATOGRAPHY USING MICROPOROUS HOLLOW FIBERS

Edward L. Cussler, Edina, Minn., assignor to Hoechst Celanese Corporation, Somerville, N.J.

Filed Nov. 15, 1988, Ser. No. 271,449
Int. Cl.[5] B01D *15/08*
U.S. Cl. 210—635 17 Claims



1. A liquid chromatography method for separating at least solute species A and B comprising the steps of:

(a) immobilizing, within pores of a number of open celled, microporous hollow fibers having an average pore size of less than 5,000 Å, an inner diameter of from about 5 to about 1500 microns, a coefficient of variation in inner diameter of less than about 8%, and an average ratio of maximum pore density to minimum pore density around the circumference of the fiber of less than about 3:1, a solute-absorbing phase having a greater affinity for absorbing/desorbing solute species A as compared to solute species B;

(b) passing a carrier liquid stream through the lumens of said microporous hollow fibers; and then

(c) injecting a sample mixture comprised of solute species A and B into said carrier liquid stream so that a liquid mixture comprised of said carrier liquid and said solute species A and B passes through the lumens of said hollow fibers;

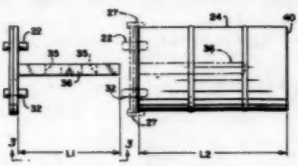
(d) allowing said solute species A to be absorbed preferentially by said immobilized solute-absorbing phase so that a first mixture comprised essentially of the carrier liquid and solute species B is initially discharged from said hollow fiber lumens; and then

(e) allowing the solute species A to desorb into said carrier liquid stream so as to form a second mixture comprised essentially of the carrier liquid and the solute species A which is discharged from said hollow fiber lumens subsequent to the discharge of said first mixture comprised essentially of the carrier liquid and solute species B, whereby solute species A and B are separated from said sample mixture thereof.

4,957,621
BAFFLE PLATE FOR WATER PURIFICATION RESERVOIR

Pete Rohloff, Riverton, Kans., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Jul. 21, 1989, Ser. No. 383,002
Int. Cl.[5] B01D *21/02*
U.S. Cl. 210—171 **14 Claims**



1. A liquid purifier reservoir for separating impurities from a liquid comprising:

a removable substantially vertical planar endwall attached to the reservoir;

a substantially vertical baffle plate attached to and extending perpendicular to said removable endwall into an interior portion of said reservoir, dividing said reservoir into first and second compartments;

input means, mounted on a first face of the endwall, for feeding the liquid into said first compartment;

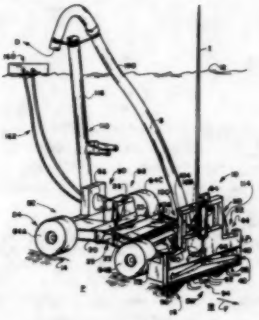
output means, mounted on said first face of the endwall, for draining the liquid from said second compartment; and

means for providing a plurality of paths for the liquid to travel between the two compartments, wherein the liquid travels in a first direction while in said first compartment, and a second direction while in said second compartment, said first and second directions being substantially opposite to each other.

4,957,622
APPARATUS FOR REMOVING SEDIMENT FROM PONDS

Ken Mims, Lake Monroe, Fla., assignor to Uddo-Mims International, Inc., Edgewater, Fla.

Filed Jul. 18, 1988, Ser. No. 220,592
Int. Cl.[5] B01D *21/00*
U.S. Cl. 210—170 **11 Claims**



1. An apparatus for removing a layer of sediment which has settled on the bottom of a pond; comprising:

a frame being submersible in the pond;

motive means for moving said frame along the bottom of the pond;

a hydrostatic chamber being positioned on said frame;

said hydrostatic chamber having an aperture formed therein for receiving a mixture of sediment and water from the bottom of the pond;

vent means for venting said hydrostatic chamber to atmospheric pressure;

pump means in fluid communication with said hydrostatic chamber to create a reduced pressure in said hydrostatic chamber relative to pressure exterior to said hydrostatic chamber for drawing the sediment and water mixture through said aperture into said hydrostatic chamber to form a slurry therein and for removing said slurry from said hydrostatic chamber for disposal away from said pond;

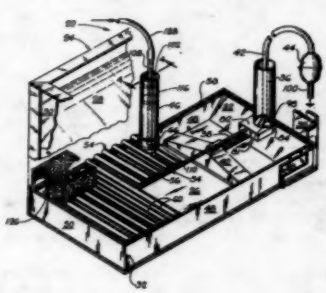
said aperture in said hydrostatic chamber being substantially rectangular in shape with a long side of said rectangular shape being substantially parallel to the bottom of the pond; and

gate means extending parallel to and proximate said pond bottom for controlling the opening size of said aperture in said hydrostatic chamber and for regulating the ratio of sediment to water removed from the bottom of the pond.

4,957,623
AQUARIUM CLEANING SYSTEM USING MOVABLE UNDERGRAVEL SUCTION HEAD

Joseph C. Henzlik, 730 Judson Ave. #16, Highland Park, Ill. 60035

Filed Feb. 2, 1990, Ser. No. 474,515
Int. Cl.[5] B01D *27/00, 29/01;* A01K *63/04*
U.S. Cl. 210—169 **24 Claims**



1. An aquarium cleaning system comprising:

a tank having a bottom wall and side and end walls;

an apertured floor plate disposed above the bottom wall and defining a space between the floor plate and the bottom wall of the tank;

first guide means extending upwardly from the floor plate;

a suction head located in said space and being movable therein; and

a siphon tube extending downwardly in guided relation with the guide means and having the inner end thereof connected to and movable with the suction head.

4,957,624
METHOD OF AND ARRANGEMENT FOR PURIFYING CONTAMINATED WATER

Anthony Peravio, Nyack, N.Y., assignor to Purewater Sciences International, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 872,162, Jun. 9, 1986, abandoned. This application May 27, 1987, Ser. No. 54,571
Int. Cl.[5] C02F *1/02*
U.S. Cl. 210—129 **34 Claims**

1. An arrangement for purifying water, comprising receiving means for receiving water;

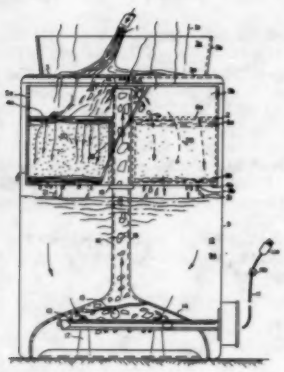
said receiving means including means for introducing water to be purified into said receiving means;

said receiving means further including holding means for accumulating and holding a body of water therein;

filtering means provided in said receiving means for filtering the water introduced into said receiving means prior to being introduced into said holding means to obtain partially-purified water;

said filtering means being comprised of means for adsorbing and absorbing undesirable matter from the heated water passing through said filtering means;

means for heating at least some of the water in said holding means to a temperature to and about the boiling point thereof;



means in said receiving means for returning the partially purified heated water to said filtering means, which, in turn, filters and returns the water passing through said filtering means to said holding means to begin a new heating and filtering cycle with attendant further purification of the partially purified water, said heating means being maintained activated until the degree of contamination of such water is dropped below a predetermined level;

said receiving means including venting means for enabling volatile matter in the water passing out of the returning means to freely pass through said venting means and into the atmosphere.

4,957,625

CERAMIC FILTER MODULES IN SERIES WITH PISTON BACKWASH

Yoshihisa Katoh, Toyota; Takashi Ogawa; Mitsumasa Hasegawa, both of Kariya; Masashi Fujimoto, Tokoake, and Masaaki Hayashi, Anjyo, all of Japan, assignors to Toshiba Ceramics Co. Ltd., Tokyo, Japan

Continuation of Ser. No. 87,290, Aug. 20, 1987, abandoned. This application Apr. 27, 1989, Ser. No. 344,498

Claims priority, application Japan, Aug. 20, 1986, 61-194595; Mar. 6, 1987, 62-51365

Int. Cl.[5] **B01D** *29/66*

U.S. Cl. 210—119 **5 Claims**

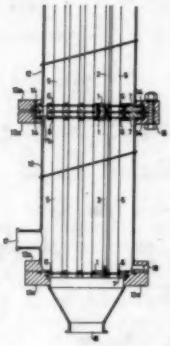
1. An apparatus for filtering a liquid, comprising:

a container for storing a liquid;

a filter casing containing two modules joined in series, each of the modules comprising a plural number of pipe-like ceramic filters arranged in parallel and having plural passages therein, plural end plates equal in number to the number of ceramic filters and having plural through-holes into which the ceramic filters are inserted, plural supports placed between the end plates for supporting the end plates in a fixed manner, and packings placed between the end plates and the ceramic filters in clearances defined between the end plates and the ceramic filters so that the packings cover portions of end surfaces of the ceramic filters and provide a seal between the through-holes of the end plates and the ceramic filters, the through-holes having inner diameters greater than corresponding outer diameters of the ceramic filters;

means for connecting the container with the filter casing so that the liquid stored in the container can be supplied into the filter casing;

plural packing pressure plates for fixing the casing to the end



plates, the pressure plates having plural holes at positions corresponding to the through-holes to the end plates and applying a pushing force onto the packings so as to substantially completely seal the filters, the pressure plates having holes communicating with outer sides of the filters;

a back washing device attached to the filter casing which includes a hydraulic pressure device having a piston movable in a cylinder so that the filter can be back washed with filtrate moved by the piston when the hydraulic pressure device is actuated, and

the piston being designed to move back to its original position after the back washing.

4,957,626

METHOD AND APPARATUS FOR TREATING WATER IN BEVERAGE AND ICE MACHINES

Clifford L. Ashbrook, Spicewood, and Douglas B. Scarborough, San Antonio, both of Tex., assignors to Quinetics Corporation, San Antonio, Tex.

Continuation-in-part of Ser. No. 726,429, Apr. 24, 1985, Pat. No. 4,645,606, and a continuation-in-part of Ser. No. 18,049, Feb. 24, 1987, Pat. No. 4,764,283. This application Aug. 25, 1987, Ser. No. 89,071

The portion of the term of this patent subsequent to Feb. 24, 2004, has been disclaimed.

Int. Cl.[5] **B01D** *1/48*

U.S. Cl. 210—695 **3 Claims**

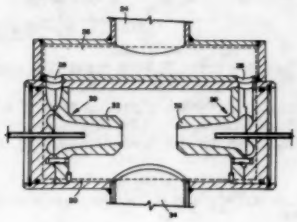
1. A method for treating water in beverage and ice machines comprising the steps of:

pumping the water through a first vortex nozzle;

simultaneously pumping water through a second vortex nozzle;

agitating the water by spraying the water exiting the first

vortex nozzle against the water exiting the second vortex nozzle;



simultaneously magnetically affecting the water by a magnetic affecting means mounted in close proximity to the nozzles.

4,957,627

PROCESS FOR LIQUID-SOLID CONTACT

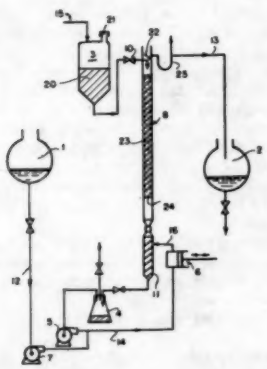
Johannes M. H. Fortuin, Sittard; Johannes C. Göebel, Hoofddorp, and Antonius J. F. Simons, Geleen, all of Netherlands, assignors to Stamicarbon B. V., Geleen, Netherlands

Continuation of Ser. No. 101,526, Sep. 28, 1987, abandoned. This application Apr. 7, 1989, Ser. No. 334,558

Claims priority, application Netherlands, Sep. 27, 1986, 8602447

Int. Cl.[5] B01D *15/02*

U.S. Cl. 210—679 **6 Claims**



1. A process for contacting:
(1) a particulate solid phase, and
(2) a liquid phase
in a column which comprises
providing at least a zone in said column filled with inert packing material, and
effecting countercurrent flow and contact between said solid phase and said liquid phase within said packed zone, wherein said solid phase and said liquid phase pass through said packing material, while
pulsating said liquid phase in said packed zone of said column to induce local turbulence therein,
whereby said solid phase and said liquid phase interact with each other within said zone.

4,957,628

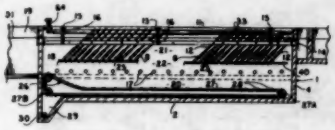
APPARATUS FOR GRAVITY SEPARATION OF PARTICLES FROM LIQUID

Christopher R. Schulz, 46 Ancell St., Alexandria, Va. 22305

Filed May 19, 1989, Ser. No. 354,440

Int. Cl.[5] B01D *21/04*

U.S. Cl. 210—519 **12 Claims**



1. An apparatus for sedimentation of particles from liquid comprising;
a basin including a pair of substantially parallel side walls, inlet and outlet means in said basin for respectively admitting and discharging liquid from said basin, said outlet means defining a top surface of liquid within said basin,
a plurality of substantially planar settler members having opposite ends and spanning said basin,
elongated support means having opposite ends and attached to said settler member ends,
mounting means on said basin including a top channel and bottom support member engageable with said support means opposite ends,
said mounting means including longitudinally displaceable means operable to vary the inclination of said support means and attached settler member ends, and
said longitudinally displaceable means including a roller assembly within said top channel adjacent each said settler member end.

4,957,629

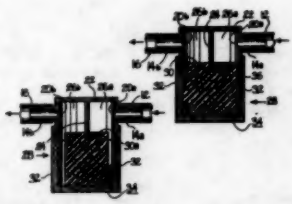
OBSTETRICAL FILTER AND TRAP

Lawrence M. Smith, and Emily M. Smith, both of P.O. Box 5877, Bend, Oreg. 97708

Filed Nov. 28, 1988, Ser. No. 277,007

Int. Cl.[5] B01D *35/01, 35/30*

U.S. Cl. 210—443 **11 Claims**



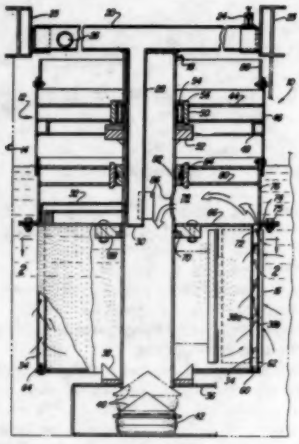
1. A filter for obstetrical fluids and particulate matter, comprising:
a. an enclosure containing a first chamber and a second chamber;
1. said first chamber having therein:
A. a solid partition having an edge, said partition forming first and second cavities in said first chamber;
I. said first cavity having an inlet thereinto;
II. said second cavity having an outlet therefrom;
2. said second chamber containing a filter means having a surface thereon; and
3. said edge of said partition pressing against said surface of said filter means.

4,957,630

DRUM FILTER WITH DIVERGENT HOLE PERFORATED FILTER MEDIA

Jack R. Bratten, 5970 St. James Dr., West Bloomfield, Mich. 48033

Filed Dec. 27, 1988, Ser. No. 289,730
Int. Cl.[5] B01D *33/04*
U.S. Cl. 210—358 12 Claims



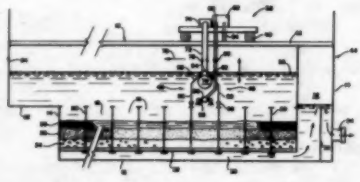
1. A drum filter comprising:
a tank adapted to receive liquid to be filtered;
a drum member having an outer surface disposed in said tank, said drum member having attached to a portion of its outer surface a porous filter media layer through which is drawn liquid to be filtered from said tank by flow in one direction through said filter media layer;
means for collecting said flow of liquid after passing through said filter media layer;
said filter media layer comprised of a thin layer of perforated metal having a pattern of substantially round holes increasing in diameter through the thickness of said layer, to diverge in said direction of flow through said filter media layer, whereby clogging of said holes tends to be cleared by said diverging shape of said holes.

4,957,631

TRAVELING BRIDGE FILTER WITH SURFACE WASH

Julian R. Pauwels, Thomasville, Ga., assignor to Davis Water and Waste Industries, Inc., Thomasville, Ga.

Filed Jan. 26, 1989, Ser. No. 301,715
Int. Cl.[5] B01D *24/22*
U.S. Cl. 210—264 18 Claims



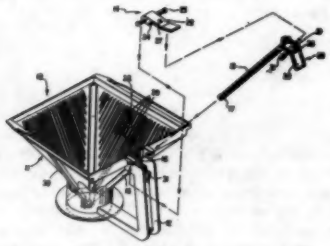
1. In a traveling bridge filter cleaning system including a liquid filtration tank divided into a plurality of adjacent filter cells, each of said cells containing filter media, a traveling bridge carriage located above said tank and movable along said tank, said carriage mounting a surface wash manifold and a backwash manifold within a suspended hood assembly adapted to sealingly engage each of said cells, said surface wash manifold including a plurality of nozzles extending therefrom, said surface wash manifold and said plurality of nozzles being substantially fixed relative to said hood assembly.

4,957,632

VALVE CLOSING DEVICE FOR A FILTER VESSEL IN A BEVERAGE MAKER

Jürgen Böckstiegel; Dieter Brindöpke, both of Minden, and Peter Ulrich, Rahden, all of Fed. Rep. of Germany, assignors to Melitta-Werke Bentz & Sohn, Minden, Fed. Rep. of Germany

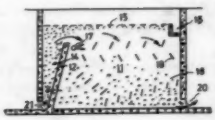
Filed Sep. 21, 1988, Ser. No. 247,272
Claims priority, application Fed. Rep. of Germany, Sep. 21, 1987, 8712709[U]
Int. Cl.[5] B01D *29/085*
U.S. Cl. 210—248 10 Claims



1. In a filter vessel for making coffee or tea, including:
a vessel body adapted to accommodate liquid therein;
means defining an outlet opening in a bottom zone of said vessel body;
a carrying handle mounted on the vessel body;
an assembly for selectively opening or closing said outlet opening; said assembly including
a closing rod extending alongside said vessel body and being longitudinally movably supported thereby between first and second positions;
a valve means mounted on said closing rod for cooperating with said outlet opening; said valve means maintaining said outlet opening open in said first position of said closing rod and said valve means maintaining said outlet opening closed in said second position of said closing rod; and
operating means arranged in an upper zone of said carrying handle and coupled to said closing rod for manually moving said closing rod into one of said position;
the improvement comprising
(a) spring means for urging said closing rod into said first position;
(b) an operating lever pivotally supported by said vessel body in said upper zone of said carrying handle and having a depressed position and a raised position; said operating lever forming part of said operating means;
(c) an arm formed on said closing rod and defining an engagement face; said arm extending below said operating lever and having a free terminal length portion adjoining said engagement face;
(d) a clamping cam carried by said operating lever; said clamping cam being in contact with said engagement face and displacing said engagement face and said closing rod towards said second position upon manual movement of said operating lever into said depressed position;
(e) an indicator pin affixed to said free terminal length portion and oriented towards said operating lever; and
(f) a throughgoing aperture provided in said operating lever and being in alignment with said indicator pin; said indica-

tor pin projecting into said throughgoing aperture in said depressed position of said operating lever.

4,957,633
FLOATATION CLARIFYING AND FLOCCULATING/PURIFICATION OF LIQUID
Oiva Suutarinen, Ryalkuja 5, 02260 Espoo, Finland
Filed Feb. 7, 1989, Ser. No. 307,732
Int. Cl.[5] B03D *1/00*; C02F *1/24*
U.S. Cl. 210—705 **5 Claims**



1. Method for purifying liquid of solid and dissolved impurities, comprising the steps of

forming on top of the liquid in a basin, a sludge bed of particles containing impurities,

conducting the thus-formed sludge bed on top of the liquid out of the basin,

adding at least one flocculating chemical into said basin whereby said chemical becomes mixed with the remaining liquid and forms particles with impurities not removed with the sludge bed, in a lower part of the same basin, and thus flocculating said remaining liquid, and

conducting said thus-flocculated remaining liquid out from said basin,

whereby said steps of forming the sludge bed, and flocculating the remaining liquid are all carried out in the same basin,

wherein said thus-flocculated remaining liquid is conducted out of said basin through a flow aperture situated in the lower part thereof and

comprising the additional step of

conducting said thus-flocculated remaining liquid to additional separation treatment after removal from said basin and further comprising the additional step of introducing a water/air mixture through a distribution pipe into the liquid combining the solid and dissolved impurities as said liquid rises in an ascending channel into said basin,

whereby the air contained in said water/air mixture is distributed substantially across an entire width of said basin in the form of minute air bubbles which adhere to the impurity particles in the liquid to which liquid an initial flocculating chemical has been added to form particles of impurities and carry the same to the top surface of the liquid, thereby enhancing said formation of the sludge bed on top of the liquid and

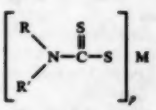
comprising the additional step of

enhancing said flocculating of the liquid in said basin and providing uniform flow of said liquid in the entire basin area by employing apparatus for enhancing said flocculating and providing uniform flow within said basin and wherein said at least one flocculating chemical is added into said liquid through a chemical supply pipe situated over substantially an entire width of said basin.

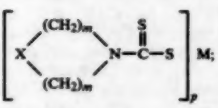
4,957,634
HEAVY METAL RECOVERY PROCESS
Joseph S. Bowers, Jr., Apt. 1309, 3310 Washington Ave., Pascagoula, Miss.
Filed Oct. 6, 1989, Ser. No. 417,883
Int. Cl.[5] C02F *11/14*
U.S. Cl. 210—711 **25 Claims**

1. A process for the simultaneous recovery of heavy metal sulfides and alkali/alkaline earth salts of N-substituted dithiocarbamic acid, comprising the step of:

contacting, in the presence of an aqueous solvent, an alkali/alkaline earth metal sulfide selected from the group consisting of sodium sulfide, potassium sulfide, magnesium sulfide and calcium sulfide, with heavy metal salts of an N-substituted dithiocarbamic acid represented by a formula selected from the group consisting of the following formulas (1) and (2):


(1)

and


(2)

wherein M represents chromium, manganese, iron, cobalt, nickel, copper, zinc, palladium, silver, cadmium, tin, platinum, gold, mercury, lead, barium, radium or uranium; R represents any alkyl, cycloalkyl, alkylaryl, or aryl; R′ represents any alkyl, cycloalkyl, alkylaryl, aryl or hydrogen, and wherein R and R′ may be alike or different at the same time; X represents O, N, S, N—R″ or $(CH_2)_n$; R″ represents alkyl, cycloalkyl, alkylaryl, aryl or hydrogen; m is an integer from 1 to 2; n is an integer from 1 to 2; and, p is an integer from 1 to 3.

4,957,635
BAG FILTER
John Dragasevich, Willowdale, Canada, assignor to GAF Chemicals Corporation, Wayne, N.J.
Continuation-in-part of Ser. No. 157,387, Feb. 18, 1988, Pat. No. 4,842,747. This application Feb. 15, 1989, Ser. No. 311,226
The portion of the term of this patent subsequent to Jun. 27, 2006, has been disclaimed.
Int. Cl.[5] B01D *37/00*
U.S. Cl. 210—767 **2 Claims**

1. A gravity-aided downflow filter device for a liquid containing suspended flake like particles which comprises a body member having an inner wall defining an axial, vertical, main flow passage, an upper inlet conduit and a lower exit conduit connected to the main flow passage for the liquid being treated, an annular straining filter sealingly mounted within said main flow passage so as to define a chamber between the outer surface of said straining filter and said inner wall of said body member, agitator means mounted within said main flow passage and to be spaced from said straining filter, wherein said agitator means includes an adjustable angle blade means with a drive shaft, said drive shaft being coaxial with said straining filter along a shaft axis, said drive shaft having a plurality of peripherally spaced radial arms cantilevered therefrom, each said radial arm having an elongate blade extending in an axial direction, each said blade having a pitch angle for sweeping a wave of liquid along an inner face of the straining filter.

4,957,636
DEVICE FOR SKIMMING OIL FROM WATER

Donald L. Wilson, Crossville, Ill., and Jerry C. Trippe, Fairfax Station, Va., assignors to General Technology Applications, Inc., Manassas, Va.

Filed Sep. 27, 1989, Ser. No. 413,084
Int. Cl.[5] E02B *15/04*
U.S. Cl. 210—242.3 **12 Claims**

1. A device for removing oil from the surface of water comprising:

a frame of generally rectangular shape having a front, a back, and two sides;

two drums of equal diameter spaced apart from one another along a common axis and arranged to rotate in the same direction, said axis parallel to the front of said frame;

a collection trough forming the front of said frame and extending the full length of both said drums;

a reservoir trough extending parallel to the axis of said drums but spaced apart from the drum surfaces, said reservoir trough forming the back of said frame, said drums and said reservoir trough proportioned and arranged to provide all of the buoyancy necessary to float said device on water in an oil-removing attitude;

blade means bearing against the surface of both said drums and arranged to direct oil from said drum surfaces into said collection trough;

motive means arranged to drive said drums in a direction whereby oil floating on water is drawn backwardly beneath the drums;

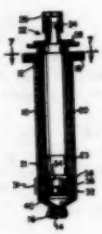
channel means extending between said collection trough and said reservoir trough; and

means to remove fluid from said reservoir trough.

4,957,637
SERUM SEPARATOR SYSTEM FOR CENTRIFUGE WITH PIERCABLE MEMBRANE

William D. Cornell, Ballwin, Mo., assignor to Sherwood Medical Company, St. Louis, Mo.

Filed May 23, 1988, Ser. No. 197,753
Int. Cl.[5] B01D *33/00, 21/26*
U.S. Cl. 210—782 **14 Claims**



14. A method for separating and isolating the lighter components of a blood specimen from its heavier components comprising the steps of:

providing a device having a barrel with an upper opening and means for selectively introducing said blood specimen, using a needle through a lower end of said barrel, said introducing means comprising a piercable membrane, a container acting as a fluid plunger slidable within said barrel between upper and lower positions, said container including a lower opening and an upper opening, one-way valve means disposed on said lower opening of said container between said container and said barrel for controlling fluid flow therebetween, said valve means operating in response to the direction of container movement within said barrel wherein upward container movement opens said valve and downward container movement closes said valve, and filter means disposed immediately above said one-way valve means within said fluid flow;

lifting said container within said barrel such that said valve means closes, thereby creating a vacuum within said barrel;

using said created vacuum within said barrel to draw in said blood specimen from a blood source;

removing said needle from said membrane;

centrifuging said barrel such that said container blood specimen separates into lighter and heavier fluid components, said lighter fluid components being located closer to said container than said heavier components;

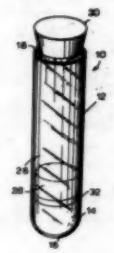
lowering said container into said lighter fluid components such that said valve means opens and said lighter fluid components flow past said filter means into said container; and

lifting said container such that said valve means closes, thereby isolating said lighter components from said heavier components.

4,957,638
METHOD FOR SEPARATING THE CELLULAR COMPONENTS OF BLOOD SAMPLES

Ward C. Smith, Mahwah, N.J., assignor to Becton Dickinson and Company, Franklin Lakes, N.J.

Continuation of Ser. No. 112,721, Oct. 23, 1987, Pat. No. 4,844,818. This application May 9, 1989, Ser. No. 349,600
The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.
Int. Cl.[5] B01D *21/26*
U.S. Cl. 210—782 **36 Claims**



21. A method for separating lymphocytes and monocytes from granulocytes in a sample of unseparated whole blood wherein an apparent shift in the buoyant density of the granulocytes is inhibited and any loss in the buoyant density of the granulocytes is restored, said method comprising the steps of:

(a) introducing a water insoluble, thixotropic gel-like substance into a vessel having an open end and a closed end, said thixotropic gel-like substance being positioned adjacent said closed end;

(b) introducing a chemical reagent that is adapted to alter the osmolarity of said blood resulting in a change in cell diameters and cell densities of said granulocytes into said vessel;

(c) providing within said vessel, means for preventing the absorption of water by said thixotropic gel-like substance from at least one of said chemical reagent and said sample of unseparated whole blood so as to substantially eliminate the influence of water absorption on the cell separation performance characteristics of said thixotropic gel-like substance;

(d) introducing said sample of unseparated whole blood into said vessel; and

(e) centrifuging said vessel at a force and for a sufficient length of time to cause said thixotropic gel-like substance

to flow in order to form a barrier between said lymphocytes and monocytes, and the granulocytes.

4,957,639

METHOD FOR ENHANCING RECOVERY OF OIL AND COMPOSITIONS RELATED THERETO

J. Thomas Fox, Beaumont, Tex., assignor to Emox High Technology, Inc., Winnie, Tex.

Filed Jun. 1, 1987, Ser. No. 55,840
Int. Cl.[5] E21B *43/22*
U.S. Cl. 252—8.554 5 Claims

1. A method for enhancing the recovery of oil from subterranean formations comprising:

(a) reacting in alkaline aqueous solution 2 to 30%, by weight, a group IA and/or IIA metal oxides or hydroxides with 2 to 30%, by weight, a silicon metal and 1 to 96%, by weight, of at least one nitrogenous organic compound selected from the group consisting of diamines, triamines, di-, tri-, tetra- amine bottoms; and mixtures thereof;

(b) introducing said solution of (a) into an oil-bearing geologic formation; and

(c) recovering said oil.

4,957,640

CORROSION PREVENTION WITH COMPOSITIONS PREPARED FROM ORGANIC FATTY AMINES AND NITROGEN-CONTAINING AROMATIC HETEROCYCLIC COMPOUNDS

Duane S. Treybig, and Robert G. Martinez, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 168,296, Mar. 15, 1988, abandoned, which is a division of Ser. No. 787,819, Oct. 15, 1985, Pat. No. 4,761,473. This application Mar. 3, 1989, Ser. No. 318,772
Int. Cl.[5] E21B *41/02*; C23F *11/00*
U.S. Cl. 252—8.555 9 Claims

1. A method for preventing the corrosion of a metal composition in contact with a down hole well fluid, which method comprises contacting the surface of said metal composition with an effective amount of, as a corrosion inhibitor, a composition which comprises the reaction product of the components selected from the group consisting of

(A) at least one pyrazine, pyrimidine, pyridazine, quinoline, isoquinoline, cinnoline, naphthyridine, or pyridine compound, which compound(s) is (are) free of unsaturated hydrocarbon substituents, having one or more rings, at least one nitrogen atom and containing at least one group selected from

(1) carboxylic acid,

(2) carboxylic acid ester,

(3) acyclic carboxylic acid anhydride,

(4) carboxylic acid halide or

(5) combination thereof; with

(B) an organic amine having from about 1 to about 72 carbon atoms; and

(C) optionally reacted or neutralized with a mineral acid or an organic acid having from about 1 to about 36 carbon atoms; and

wherein components (A) and (B) are present in quantities which provide a ratio of —CO— groups to $—NH_2$ and/or —NH— groups of from about 0.1:1 to about 1.2:1 and component (C) is present in a quantity which provides a ratio of mineral acid or carboxylic acid to reactive amine hydrogen of the product formed from the reaction of components (A) and (B) of from about zero:1 to about 2:1.

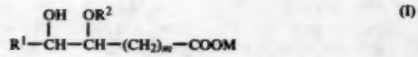
4,957,641

USE OF ALKOXYHYDROXY FATTY ACIDS AS CORROSION INHIBITORS IN OILS AND OIL-CONTAINING EMULSIONS

Gerhard Borggrefe, Duesseldorf; Alfred Meffert, Monheim; Bert Gruber, Duesseldorf, and Karl-Heinz Schmid, Mettmann, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Oct. 15, 1986, Ser. No. 919,098
Claims priority, application Fed. Rep. of Germany, Nov. 13, 1985, 3540246
Int. Cl.[5] C10M *129/04, 129/26*
U.S. Cl. 252—34 10 Claims

1. A process for corrosion inhibition of a metal comprising contacting said metal with an oil or oil containing emulsion containing an effective amount to inhibit corrosion of an alkoxyhydroxy fatty acid or a salt thereof having the general formula (I)



(I)

wherein

R^1 represents a straight chain alkyl radical or a straight chain alkenyl radical having from 6 to 8 carbon atoms,

R^2 represents a straight chain or branched chain alkyl radical having from 1 to 18 carbon atoms, or a straight chain or branched chain alkenyl radical having from 2 to 18 carbon atoms,

M represents hydrogen or an organic ammonium radical having one or more alkyl radicals or hydroxyalkyl radicals attached to the nitrogen atom, and

m represents an integer having a value of from 3 to 13, in an amount of from about 0.01 to about 10% by weight, based on the weight of said oil or said oil-containing emulsion.

4,957,642

MAGNESIUM PHENATE DETERGENTS

John A. Cleverley, Didcot; John F. Marsh, Abingdon; Philip Skinner, Grove, and Gaynor M. Miasik, Cwmdare, all of United Kingdom, assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Dec. 27, 1988, Ser. No. 290,024
Claims priority, application United Kingdom, Dec. 29, 1987, 8730220
Int. Cl.[5] C10M *129/10*
U.S. Cl. 252—42.7 13 Claims

1. A process for preparing a non-overbased magnesium phenate which comprises reacting a reaction mixture consisting essentially of (1) a magnesium compound (2) a phenol, a methylene bis-phenol or a sulphurised phenol, (3) an organic solvent containing one or more alcoholic hydroxyl groups, (4) a promoter selected from a ketone, diketone, and aldehyde and (5) optionally a diluent oil, said reaction mixture containing less than 0.2 wt. % of inorganic halide.

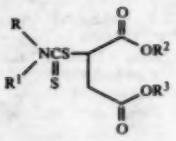
4,957,643

LUBRICANT COMPOSITIONS

William Y. Lam, Ballwin, Mo., assignor to Ethyl Petroleum Additives, Inc., St. Louis, Mo.

Division of Ser. No. 196,507, May 20, 1988, Pat. No. 4,885,365. This application Sep. 29, 1989, Ser. No. 415,093
Int. Cl.[5] C10M *135/18*
U.S. Cl. 252—47.5 7 Claims

1. A lubricating composition containing a major amount of lubricating oil and a minor antiwear-antioxidant amount of an additive compound having the general formula:



(A)

wherein:

a. R is an organic radical selected from an aryl group selected from a benzene or an naphthalene group or an aralkyl group, wherein the aryl portion is selected from a benzene or a naphthalene group, in which the aryl or aralkyl groups contain up to 15 carbon atoms;

b. R^1 is hydrogen or an organic radical selected from an alkyl group, an alkenyl group, an aryl group selected from a benzene or a naphthalene group or an aralkyl group, wherein the aryl portion is selected from a benzene or a naphthalene group, in which the alkyl or alkenyl groups contain up to 32 carbon atoms and the aryl or aralkyl groups contain up to 15 carbon atoms; or

c. R and R^1 together with the nitrogen atom to which they are attached form a heterocyclic moiety selected from the group consisting of piperidine, morpholine and piperazine; and

d. R^2 and R^3 are the same or different alkyl groups containing from 1 to 32 carbon atoms each.

4,957,644

MAGNETICALLY CONTROLLABLE COUPLINGS CONTAINING FERROFLUIDS

John T. Price, 17 High Field Ln., Madison, Conn. 06443, and Jurgen M. Kruse, 129 Florence Rd., Branford, Conn. 06405

Continuation of Ser. No. 188,694, May 2, 1988, Pat. No. 4,849,120, which is a continuation of Ser. No. 862,765, May 13, 1986, abandoned. This application Jun. 27, 1989, Ser. No. 372,294

The portion of the term of this patent subsequent to Jul. 18, 2006, has been disclaimed.

Int. Cl.[5] C04B *35/00*

U.S. Cl. 252—62.52 **17 Claims**

1. A magnetic flux transmitting ferrofluid comprising a stable suspension of magnetizable particles having a size of at least one micron, a carrier fluid, and a complexing agent, wherein the complexing agent comprises a chelating agent that forms a multiple coordinate bond with the magnetizable particles which are maintained in suspension within the carrier fluid such that the ferrofluid transmits a substantial magnetic flux without substantial separation of the particles from the carrier fluid.

4,957,645

OIL SOLUBLE DISPERSANT ADDITIVES USEFUL IN OLEAGINOUS COMPOSITIONS

Jacob Emert, Brooklyn, N.Y., and Robert D. Lundberg, Bridgewater, N.J., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Feb. 29, 1988, Ser. No. 161,904

Int. Cl.[5] C10M *151/00*

U.S. Cl. 252—47.5 **40 Claims**

1. An oil soluble composition useful as dispersant additive for lubricating oil composition comprising reaction product of:

(1) at least one nitrogen containing adduct selected from the group consisting of oil soluble salts, amides, imides, or mixtures thereof of long chain hydrocarbyl substituted mono- or dicarboxylic acids or their anhydrides, said adduct containing at least one reactive amino group; and

(2) at least one polythioepoxide.

21. A lubricating oil composition comprising:

(A) lubricating oil; and

(B) oil soluble dispersant comprising reaction product of

(1) at least one nitrogen containing adduct selected from the group consisting of oil soluble salts, amides, imides, or mixtures thereof of long chain hydrocarbyl substituted monoor dicarboxylic acids or their anhydrides, said adduct containing at least one reactive amino group; and

(2) at least one polythioepoxide.

4,957,646

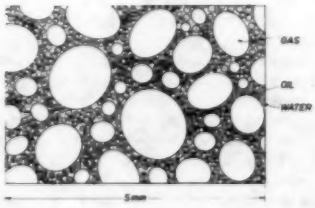
STEAM FOAM SURFACTANTS ENRICHED IN ALPHA OLEFIN DISULFONATES FOR ENHANCED OIL RECOVERY

John K. Borchardt, and Hon C. Lau, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Aug. 26, 1987, Ser. No. 89,636

Int. Cl.[5] E21B *43/22, 43/24*

U.S. Cl. 252—8.554 **9 Claims**



1. A steam form-forming surfactant mixture, useful for recovering hydrocarbons from a reservoir, comprising:

steam;

olefin sulfonate surfactant, wherein the surfactant is derived from olefins with carbon numbers in the range of about 16 to 28, and wherein the surfactant contains at least about 25 % olefin disulfonate; and

water.

4,957,647

ACYLOXYNITROGEN PERACID PRECURSORS

Alfred G. Zielske, Pleasanton, Calif., assignor to The Clorox Company, Oakland, Calif.

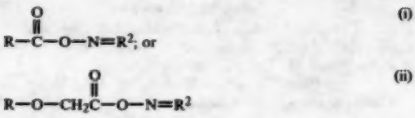
Continuation of Ser. No. 928,065, Nov. 6, 1986, abandoned. This application Apr. 14, 1989, Ser. No. 338,475

Int. Cl.[5] C09K *3/00*

U.S. Cl. 252—186.38 **9 Claims**

1. A bleaching composition comprising:

(a) a peracid precursor selected from either of:



wherein —O—N=R^2 is a leaving group in which R^2 contains a carbon atom doubly bonded directly to N, and R is C_5 to C_9 alkyl; and

(b) a bleach effective amount of a source of hydrogen peroxide.

4,957,648

SPIN FIBER LUBRICANT COMPOSITIONS

Richard Yodice, Mentor, and Gregory A. Lentz, Twinsburg, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

Continuation of Ser. No. 82,769, Aug. 6, 1987, abandoned. This application Feb. 7, 1990, Ser. No. 478,060

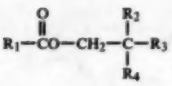
Int. Cl.[5] C10M *135/04*

U.S. Cl. 252—8.6 37 Claims

1. A composition comprising

(A) a liquid carrier and

(B) at least one ester having the general formula



wherein R_1 is selected from the group consisting of alkyl groups containing from 10 to about 22 carbon atoms, alkenyl groups containing from 4 to about 50 carbon atoms, aryl groups, alkaryl groups and aralkyl groups, and R_2, R_3, and R_4 are straight chain hydrocarbyl groups, branched chain hydrocarbyl groups or mixtures thereof, wherein said composition has utility as a spin fiber lubricant.

4,957,649

LUBRICATING OIL COMPOSITIONS AND CONCENTRATES

David E. Ripple, and William B. Chamberlin, III, both of Kirtland, Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

Filed Aug. 1, 1988, Ser. No. 226,765

Int. Cl.[5] C01M *141/02*

U.S. Cl. 252—32.7 E 42 Claims

1. A lubricating oil composition for internal combustion engines which comprises:

(A) a major amount of oil of lubricating viscosity, and minor amounts of

(B) at least one carboxylic derivative composition produced by reacting

(B-1) at least one substituted succinic acylating agent with

(B-2) from one equivalent up to two moles, per equivalent of acylating agent, of at least one amine compound characterized by the presence within its structure of at least one HN< group wherein said substituted succinic acylating agents consist of substituent groups and succinic groups wherein the substituent groups are derived from polyalkene, said polyalkene being characterized by an $\overline{Mn}$ value of about 1300 to about 5000 and an $\overline{Mw}/\overline{Mn}$ value of about 1.5 to about 4.5, said acylating agents being characterized by the presence within their structure of an average of at least 1.3 succinic groups for each equivalent weight of substituent groups,

(C) at least one partial fatty acid ester of a polyhydric alcohol, and

(D) at least one metal salt of a dihydrocarbyl dithiophosphoric acid wherein

(D-1) the dithiophosphoric acid is prepared by reacting phosphorus pentasulfide with an alcohol mixture comprising at least 10 mole percent of isopropyl alcohol, secondary butyl alcohol, or a mixture of isopropyl and secondary butyl alcohols, and at least one primary aliphatic alcohol containing from about 3 to about 13 carbon atoms, and

(D-2) the metal is a Group II metal, aluminum, tin, iron, cobalt, lead, molybdenum, manganese, nickel or copper.

4,957,650

LUBRICATING OIL COMPOSITION CONTAINING DUAL ADDITIVE COMBINATION FOR LOW TEMPERATURE VISCOSITY IMPROVEMENT

Albert Rossi, Warren; John P. Szykowski, Edison, both of N.J., and Robert D. Tack, Abingdon, United Kingdom, assignors to Exxon Chemical Patents Inc., Linden, N.J.

Division of Ser. No. 231,531, Aug. 10, 1988, Pat. No. 4,826,615, which is a continuation of Ser. No. 742,576, Jun. 7, 1985, abandoned. This application Feb. 3, 1989, Ser. No. 306,535

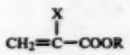
Int. Cl.[5] C10M *157/04*

U.S. Cl. 252—51.5 A 16 Claims

1. A lubricating oil composition comprising a major amount of a mineral oil of lubricating viscosity and a major amount of a dual additive combination comprising components (A) and (B) effective to lower the viscosity of said composition at temperatures between about −20° and −40° C. relative to the absence of either of Components (A) or (B), wherein:

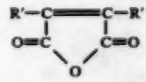
(1) Component A comprises at least one member selected from the group consisting of:

(i) a polymeric product characterized by a number average molecular weight of from about 25,000 to about 70,000 and of the type derived from the random polymerization of a reaction mixture comprised of at least 90 mole % of at least one ester monomer represented by the structural formula:



wherein X can represent hydrogen or methyl, and R represents an aliphatic hydrocarbyl group containing from 1 to about 24 carbon atoms, and up to 10 mole % of at least one ethylenically unsaturated nitrogen containing monomer with the provisos that (a) said polymer product contains from about 0.2 to about 2% by weight nitrogen, based on the weight of the polymer; and (b) the average number of carbon atoms in the hydrocarbyl group constituting R within said polymeric product is from about 8 to bout 18; and

(ii) an esterified and subsequently amine treated polymeric product containing from about 0.1 to about 0.7% nitrogen by weight, based on the esterified polymeric product weight, derived from the esterification of an interpolymer of the type derived from the reaction of a monomer mixture consisting essentially of (a) styrene and (b) a carboxyl containing monomer anhydride represented by the structural formula:



wherein each R' independently can represent hydrogen or methyl; with the molar ratio of styrene to carboxyl containing monomer in said reaction mixture being from about 3:to about 1:1 and said unesterified inter-

polymer being characterized by a number average molecular weight of from about 25,000 to about 70,000; said esterification being characterized by that resulting from the reaction of at least 50 mole % but less than 100 mole % of the carboxyl groups present on said unesterified interpolymer with a reaction mixture comprised of at least one aliphatic monohydric alcohol containing from about 1 to about 24 carbon atoms, said amine treatment being conducted with at least one organic amine in a manner sufficient to form a salt or imide with unreacted carboxyl group of the carboxyl containing monomer; and

(2) Component B comprises at least one member selected from the group consisting of:

(i) sorbitan monoesters, sorbitan diesters, sorbitan triesters, and mixtures thereof, which esters are derived from C_{10} to C_{30} straight chain saturated fatty acids;

(ii) polyoxymethylene or polyoxyethylene: esters, ethers or ether/alcohols, or ester/ether mixtures, derived from C_{10} to C_{30} straight chain saturated fatty acids, C_{10} to C_{30} saturated aliphatic alcohols, or mixtures of said fatty acids or alcohols, respectively; said polyoxymethylene segments thereof having a number average molecular weight of from about 80 to about 4,000, and said polyoxyethylene segments thereof having a number average molecular weight of from about 100 to about 5,000; and

(iii) polyoxymethylene or polyoxyethylene ethers of sorbitan monoesters, sorbitan diesters, sorbitan triesters or mixtures thereof, said sorbitan esters being derived from C_{10} to C_{30} straight chain saturated fatty acids, and said polyoxymethylene and polyoxyethylene segments thereof having number average molecular weights as described in connection with Component B-ii.

4,957,651

MIXTURES OF PARTIAL FATTY ACID ESTERS OF POLYHYDRIC ALCOHOLS AND SULFURIZED COMPOSITIONS, AND USE AS LUBRICANT ADDITIVES

James J. Schwind, Eastlake, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Filed Jan. 15, 1988, Ser. No. 144,361
Int. Cl.[5] C10M *135/02*
U.S. Cl. 252—56 R **42 Claims**

1. A composition comprising:

(A) a partial fatty acid ester of a polyhydric alcohol and

(B) a cosulfurized mixture of 2 or more reactants selected from the group consisting of

(1) at least one fatty acid ester of a polyhydric alcohol,

(2) at least one fatty acid,

(3) at least one olefin, and

(4) at least one fatty acid ester of a monohydric alcohol.

36. An additive concentrate for use in preparing lubricating compositions, comprising a substantially inert normally liquid organic diluent and about 1 to about 90 percent by weight of a composition comprising:

(A) a partial fatty acid ester of a polyhydric alcohol and

(B) a cosulfurized mixture of 2 or more reactants selected from the group consisting of

(1) at least one fatty acid ester of a polyhydric alcohol,

(2) at least one fatty acid,

(3) at least one olefin, and

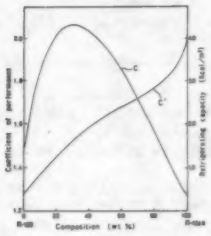
(4) at least one fatty acid ester of a monohydric alcohol.

4,957,652

REFRIGERANTS

Kohji Tamura, Kawanishi; Hiroshi Kashiwagi, Settsu, and Masahiro Noguchi, Osaka, all of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

Filed Oct. 18, 1988, Ser. No. 259,144
Claims priority, application Japan, Oct. 19, 1987, 62-264700
Int. Cl.[5] C09K *5/04*
U.S. Cl. 252—67 **5 Claims**



1. A refrigerant comprising (1) about 10 to about 97% by weight of dichlorotrifuloroethane and (2) about 90 to about 3% by weight of at least one compound selected from the group consisting of 1,1,1,2-tetrafluoroethane, 1,1,2,2-tetrafluoroethane, 1-chloro-1,1-difluoroethane, 1,1,1-trifluoroethane and 1,1-difluoroethane.

4,957,653

COMPOSITION CONTAINING ALKANE SULFONIC ACID AND FERRIC NITRATE FOR STRIPPING TIN OR TIN-LEAD ALLOY FROM COPPER SURFACES, AND METHOD FOR STRIPPING TIN OR TIN-LEAD ALLOY

John L. Cordani, Waterbury, Conn., assignor to MacDermid, Incorporated, Waterbury, Conn.

Filed Apr. 7, 1989, Ser. No. 334,918
Int. Cl.[5] C23F *1/00*; C23G *1/02*; C09K *13/06*; C11D *7/08*
U.S. Cl. 252—142 **11 Claims**

1. A composition for stripping tin or tin-lead alloy, and any underlying copper-tin alloy, from a copper surface, without bringing about significant formation of sludge, precipitate or suspended by-products, comprising an aqueous solution of an alkane sulfonic acid and ferric nitrate, each in amounts effective to strip said tin or tin-lead alloy, and any said underlying copper-tin alloy, from said copper surface without bringing about significant formation of sludge, precipitate or suspended by-products wherein said amounts are from about 10 to about 1500 g/l for said alkane sulfonic acid from about 1 g/l to saturation for said ferric nitrate.

4,957,654

METHOD FOR MAKING A STORAGE STABLE BLEND OF A LONG CHAIN POLYOL AND A SHORT CHAIN DIOL BY INCORPORATING A BISPHENOL THEREIN AND THE RESULTING BLEND

Timothy A. Tufts, 9283 Riverside Dr., Powell, Ohio 43065

Continuation-in-part of Ser. No. 36,642, Apr. 10, 1987, Pat. No. 4,786,435. This application Aug. 8, 1988, Ser. No. 229,522
Int. Cl.[5] C09K *3/00*
U.S. Cl. 252—182.25 **16 Claims**

1. A method for making a storage stable blend of a long chain polyol and a short chain diol which blend phase separates under storage, which comprises incorporating into said blend [illegible] about 5 to 20 percent of 4,4'-(I-methylethylidene) bispheno[illegible].

12. A storage stable blend which comprises: a long chain polyol, a short chain diol, and from about 5 to 20 percent of 4,4'-(1-methylethylidene) bisphenol.

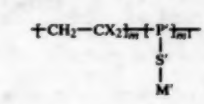
4,957,655

COPOLYMERIC NONLINEAR OPTICAL MEDIA

Garo Khanarian, Berkeley Heights, N.J.; Donald Raskin, New York, N.Y.; Alan Buckley, Berkeley Heights; Gordon W. Calundann, Somerset City, and Anthony J. East, Morris City, all of N.J., assignors to Hoechst Celanese Corp., Somerville, N.J.

Filed Jan. 12, 1989, Ser. No. 296,259
Int. Cl.[5] C09K *19/52*
U.S. Cl. 252—299.01 17 Claims

1. A nonlinear optical medium comprising a transparent thermoplastic polymer film characterized by a crystallographic molecular alignment in the film plane, and a net dipolar molecular orientation normal to the film plane; wherein the polymer is characterized by recurring monomeric units corresponding to the formula:



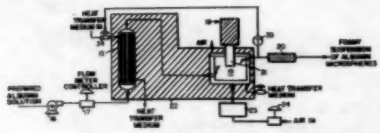
where X is a substituent selected from hydrogen, halogen, cyano, phenyl or halophenyl, and at least one X substituent is halogen or cyano; P' is a polyvinyl main chain unit; S' is a flexible spacer having a linear chain length of between about 1–20 atoms; M' is a pendant group which exhibits second order nonlinear optical susceptibility; m and m^1 are integers which total at least ten, and the m^1 monomer comprises between about 20–80 mole percent of the total $m+m^1$ monomer units.

4,957,656

CONTINUOUS SONICATION METHOD FOR PREPARING PROTEIN ENCAPSULATED MICROBUBBLES

David Cerny, Chula Vista; Gary J. Mills, and Peter J. Westkaemper, both of San Diego, all of Calif., assignors to Molecular Biosystems, Inc., San Diego, Calif.

Filed Sep. 14, 1988, Ser. No. 244,844
Int. Cl.[5] B01J *13/02;* A61K *49/00*
U.S. Cl. 252—311 6 Claims



1. The method of producing an imaging agent for diagnostic use in the human circulatory system in which an aqueous solution of human serum albumin in subjected to sonication to form minute gas-center microspheres, wherein the improvement comprises:

(a) prior to sonication rapidly heating an aqueous solution of human serum albumin to a temperature of incipient denaturation of albumin;

(b) dispersing a biocompatible gas in said heated solution;

(c) flowing the gas-containing heated solution through a chamber enclosing an operating sonicator which provides a stationary horn immersed in the solution as it passes through said chamber; and

(d) with a solution residence time in said chamber of from 1 to 20 seconds forming microspheres of less than 10 microns diameter at concentrations in excess of 40×10^6 microspheres per milliliter of solution, the stability of said microspheres being such that said solution maintains said excess concentration for over 8 weeks at 20° to 25° C.

4,957,657

PROCESS AND APPARATUS FOR COOLING AND PURIFYING A HOT GAS

Jacob H. Stil; Adrianus J. Ooms, and Bernardus H. Mink, all of The Hague, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 792,167, Oct. 25, 1985, which is a continuation of Ser. No. 677,894, Dec. 4, 1984, which is a continuation of Ser. No. 417,754, Sep. 13, 1982. This application Jan. 6, 1987, Ser. No. 4,287
Claims priority, application Netherlands, Nov. 16, 1981, 8105169
Int. Cl.[5] C01B *3/35*
U.S. Cl. 252—373 17 Claims

1. A process for cooling and cleaning hot crude synthesis gas containing sticky slag droplets and/or particles leaving a solid hydrocarbon gasification reactor comprising

(a) quenching the hot crude synthesis gas leaving the reactor in an upflow direction by injection therein of a cold purified synthesis gas and coagulating the slag droplets therein to form slag particles;

(b) reducing the velocity of the synthesis gas stream, and reversing the flow of the stream in a downward direction;

(c) increasing the velocity of the gas stream;

(d) again reversing the flow of the stream in an upflow direction, and decreasing the velocity of the gas stream;

(e) indirectly cooling the gas stream; and

(f) separating slag particles from the gas stream.

3. A process for cooling and purifying a hot synthesis gas flowing substantially vertically upwards from a hydrocarbon gasification reactor and containing sticky slag droplets and/or particles comprising

(a) injecting a cold, clean synthesis gas into the hot synthesis gas to obtain a gas mixture having a reduced temperature and coagulating the slag droplets to form slag particles;

(b) reducing the velocity of the gas mixture;

(c) reversing the flow of the gas mixture so that the gas mixture flows downward in a direction that is at an acute angle to the original substantially vertical upwards direction of flow;

(d) increasing the velocity of the gas mixture flowing obliquely downwards;

(e) cooling the gas mixture flowing obliquely downwards at an increased velocity by indirect exchange of heat;

(f) reducing the velocity of the cooled gas mixture;

(g) reversing the stream of the gas mixture having a reduced velocity so that the gas mixture flows upwards in substantially vertical direction and slag particles fall down;

(h) further cooling the gas mixture flowing substantially vertically upwards at reduced velocity by indirect exchange of heat, while a further quantity of slag particles falls down; and

(i) discharging the slag particles.

4,957,658

PROCESS AND COMPOSITION FOR PROVIDING REDUCED DISCOLORATION CAUSED BY THE PRESENCE OF PYRITHIONE AND FERRIC ION IN WATER-BASED PAINTS AND PAINT BASES

Cheryl B. French, Glastonbury, and Sigmund Breister, Hamden, both of Conn., assignors to Olin Corporation, Cheshire, Conn.

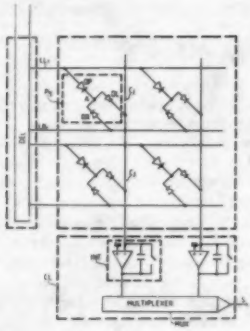
Continuation-in-part of Ser. No. 91,684, Aug. 31, 1987, Pat. No. 4,818,436. This application Feb. 24, 1989, Ser. No. 315,629
Int. Cl.[5] G09K *15/32;* C08K *5/36;* C07C *143/90*
U.S. Cl. 252—400.23 9 Claims

1. A process for reducing or inhibiting the formation of a blue discoloration in a water-based coating composition caused by the presence of ferric ion and sodium or zinc pyrithione in the composition which comprises adding thereto an alkali metal or alkaline earth metal salt of 1-hydroxyethane-1,1-diphosphonic acid.

4,957,659
PHOTOSENSITIVE MATRIX WITH THREE DIODES PER DOT WITHOUT OPTICAL RESETTING

MarcBerger Arques, both of Grenoble, France, assignor to Thomson-CSF, Paris, France

Filed Jan. 11, 1989, Ser. No. 295,555
Claims priority, application France, Jan. 15, 1988, 8800412
Int. Cl.[5] H01J *40/14*
U.S. Cl. 250—208.1 **13 Claims**



1. A matrix of photosensitive dots comprising a network of photosensitive dots arranged in at least one row and in at least one column, each photosensitive dot being located at the intersection of a row and a column, wherein each photosensitive dot comprises three diodes connected to a common floating node, a first diode being a photosensitive diode, connected between a row conductor and the floating node to generate, when it is illuminated, electrical charges at the floating node, a second diode, being a reading diode, connected between the floating node and a column conductor to enable a transfer, between this column conductor and the floating node, of a quantity of charges corresponding to the quantity of charges generated by the illumination, and a third diode, being a resetting diode, connected between the floating node and a conductor connected to a resetting voltage source, in order to reset the potential of the floating node at a chosen value after said charge transfer.

4,957,660
ELECTRICALLY CONDUCTIVE PLASTIC MOLDINGS AND PROCESS FOR PRODUCING THE SAME

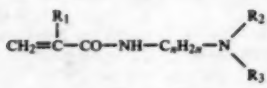
Tadayuki Ohmae; Tadashi Sakurai; Noboru Yamaguchi; Mitsuyuki Okada, and Kouichiro Asao, all of Chiba, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Apr. 29, 1988, Ser. No. 188,781
Claims priority, application Japan, Apr. 30, 1987, 62-109508
Int. Cl.[5] H01B *1/00*
U.S. Cl. 252—500 **9 Claims**

1. A conductive plastic molding which is obtained by melt molding an ethylene copolymer comprising:

from 40 to 90% by weight of an ethylene unit,

from 10 to 60% by weight of at least one dialkylaminoalkylacrylamide comonomer unit represented by formula (I)



(I)

wherein

R_1 represents a hydrogen atom or a methyl group;

R_2 and R_3 each represents an alkyl group having from 1 to 4 carbon atoms; and

n represents an integer of from 2 to 5, and

up to 20% by weight of one or more ethylenically unsaturated comonomer units and having at least 10 parts by weight of an aqueous solution of at least one compound selected from the group consisting of an organic acid, an inorganic acid, and an inorganic metal salt into 100 parts by weight of the resulting metal molded

wherein

said organic acid is selected from the group consisting of formic acid, acetic acid, oxalic acid, tartaric acid, benzoic acid, lactic acid, acrylic acid, maleic acid, methanesulfonic acid, and benzenesulfonic acid;

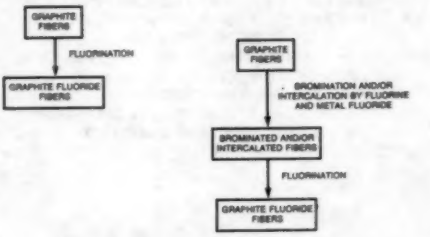
said inorganic acid is selected from the group consisting of hydrochloric acid, sulfuric acid, nitric acid, phosphoric acid, pyrophosphoric acid, polyphosphoric acid, perchloric acid, hydrofluoric acid, hydrobromic acid, and hydroiodic acid; and

said inorganic metal salt is selected from the group consisting of ferrous chloride, ferric chloride, nickel chloride, ferrous sulfate, ferric sulfate, nickel sulfate, ferrous nitrate, ferric nitrate, and nickel nitrate.

4,957,661
GRAPHITE FLUORIDE FIBER POLYMER COMPOSITE MATERIAL

Ching-Cheh Hung, Westlake, Ohio, assignor to The United States of America as represented by the United States National Aeronautics and Space Administration, Washington, D.C.

Filed Sep. 30, 1988, Ser. No. 251,499
Int. Cl.[5] H01B *1/06*
U.S. Cl. 252—510 **7 Claims**



1. A method of producing graphite fluoride composites comprising the steps of

brominating highly graphitized pitch-based fibers,

exposing the surfaces of said fibers to fluorine gas at a fluorine partial pressure between about one-half atmosphere and about one atmosphere at a temperature between about 250° C. and about 450° C. to fluorinate the same for a time sufficient to produce an electrical resistivity in the fibers between about $10^{-2}\Omega$ cm to about $10^{11}\Omega$ cm, and

combining said fluorinated fibers with a polymer which readily wets the same.

4,957,662
METHOD FOR PURIFYING FATTY ACIDS

Masao Suzuki, 2-25-B2-406 Kasaya-Cho, Nishinomiya City, Hyogo Pref., Japan

Filed Sep. 19, 1979, Ser. No. 76,829
Claims priority, application Japan, Sep. 27, 1978, 53-118024
Int. Cl.[5] C11C *1/08*
U.S. Cl. 260—419 **4 Claims**

1. A method for purifying fatty acids, comprising contacting a fatty acid with both a reducing metal selected from tin, iron, zinc, aluminum, magnesium, copper, calcium, nickel, cobalt and an alloy of these metals in an amount of 0.01–5% by

weight based on the amount of a fatty acid to be purified, and a hydrogenation catalyst selected from palladium black, palladium on carbon, platinum oxide, nickel on kieselguhr, Raney nickel, Raney iron, Raney copper, copper-chromite, molybdenum sulfide, platinum on carbon, nickel-hardened fat and rhodium-platinum in an amount of 0.01–5% by weight based on the amount of a fatty acid to be purified, and distilling the treated fatty acid.

4,957,663

METHOD OF MANUFACTURING OPTICAL COMPONENTS

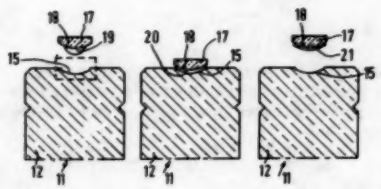
Renso J. M. Zwiers; Johannes M. G. Verhoeven, and Herman M. A. Amendt, all of Eindhoven, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.

Continuation of Ser. No. 13,320, Feb. 11, 1987, abandoned. This application Mar. 2, 1989, Ser. No. 318,508

Claims priority, application Netherlands, Feb. 13, 1986, 8600354

Int. Cl.[5] B29C *33/40, 39/10*; B29D *11/00*

U.S. Cl. 264—1.4 **11 Claims**



1. A method of manufacturing components which comprise a supporting member of glass or a synthetic resin whose surface is provided at least partly with a synthetic resin coating layer having an accurately defined surface, in which a curable liquid monomer composition is provided between an accurately defined surface of a matrix and a surface of the supporting member, the composition is cured and the supporting member together with the cured synthetic resin layer bonded thereto is removed from the matrix,

wherein a matrix is used which is the product of a method comprising the steps of interposing a layer of a curable epoxy resin between an accurately defined surface of a mold and the refractive surface of a preform, contacting said surfaces while curing said epoxy resin to a hardened state and removing a matrix from the mold, the matrix having a layered structure and comprising a preform of glass or quartz which at the area where it contacts the curable monomer composition has a skin of cured epoxy synthetic resin the surface of which is accurately defined and is the negative of the accurately defined surface of the mold from which the matrix was produced and wherein the surface of the manufactured component is the replica of the mold from which the matrix was produced.

4,957,664

APPARATUS FOR INJECTING AN ACCELERATING FUEL

Yoshihiro Kohno, Hamakita, and Kazumi Iida, Iwata, both of Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha and Sanshin Kogyo Kabushiki Kaisha, Iwata, Japan

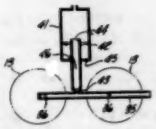
Continuation of Ser. No. 460,767, Jan. 25, 1983, abandoned. This application Dec. 7, 1984, Ser. No. 679,605

Claims priority, application Japan, Jan. 26, 1982, 57-9584

Int. Cl.[5] F02M *7/08*

U.S. Cl. 261—34.2 **4 Claims**

1. An accelerating pump system for an internal combustion engine or the like comprising an accelerating pump, a storage chamber, means for delivering fuel to said storage chamber from said accelerating pump comprising a pipe extending into said storage chamber and being open at its upper end into said storage chamber, and discharge means for delivering fuel from said storage chamber to the associated engine comprising a restricted orifice positioned in the pipe contiguous to the lowermost wall of the storage chamber, said means for delivering the fuel to said storage chamber delivers the fuel at a different rate than said discharge means delivers fuel from said storage chamber.



4,957,665

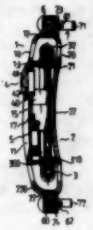
AIR COOLING DEVICE FOR ELECTRIC FAN

Run-Nin Lin, Taiwan, Taiwan, assignor to Alphacom Enterprise Co., Ltd., Taipei, Taiwan

Filed Oct. 24, 1989, Ser. No. 427,274

Int. Cl.[5] B01F *3/04*

U.S. Cl. 261—95 **5 Claims**



1. An air cooling device for electric fan, including:

a front cover comprising a circular side wall having an external thread made thereon, a plurality of rectangular openings equidistantly disposed around the periphery of the front face, an inner flange at the inner side having a key made at the inner top, an oval recess having made thereon a bolt hole for connection thereto of a water inlet control knob and an elongated hole for setting therein of a water gauge, and four water bumpers made at the inner side below said bolt hole;

a back cover comprising a circular side wall having an internal thread made thereon for connection with the external thread of the circular side wall of said front cover, a plurality of rectangular openings properly set to aim at the rectangular openings of said front cover, two bolt seats respectively set at the top and the bottom each having a through-hole made thereon for insertion therethrough of a fastening knob to secure a fastening plate thereto, and an inner flange defining therein a spherical surface for receiving the center ring of the wire protective cover of an electric fan; and

a water absorbing ceramic having a circular body structure comprising a convex-concave outer wall surface and two circular grooves respectively for setting therein of the inner flanges of said front and back covers;

wherein said front cover is screwed up with said back cover with the water absorbing ceramic received therein and tightly squeezed in between the inner flange of said front cover and the inner flange of said back cover to define

therein a water receiving space for filling of water, and the two fastening plates which are connected to said two bolt seats are secured to the wire front cover of an electric fan to let air flow pass through the air cooling device.

4,957,666

METHOD OF PRODUCING A SLURRY OF MICROCAPSULES

Michio Kawamura; Yasunori Shimada; Koichi Inoshita; Shozo Yoshida; Toshiaki Kawanabe; Haruo Hattori, all of Iyomishima; Yukio Doi, Katashima, and Mamoru Awano, Ibaraki, all of Japan, assignors to Taio Paper Manufacturing Co., Ltd. and Showa High Polymer Co., Ltd., both of Tokyo, Japan

Filed Sep. 13, 1988, Ser. No. 243,671

Claims priority, application Japan, Jan. 29, 1988, 63-17347

Int. Cl.[5] B01J *13/02, 13/18;* **B41M** *5/124*

U.S. Cl. 264—4.7 **8 Claims**

1. A method of producing a slurry of microcapsules having wall membranes comprised of an amino resin, the method comprising:

(a) providing an acidic aqueous solution comprised of water and an anionic polyelectrolyte which is an anionic terpolymer of acrylic acid, acrylonitrile, and polyethyleneglycol methacrylate phosphate, and which is water soluble and has a high molecular weight;

(b) mixing an amino compound and an aldehyde into the acidic aqueous solution in quantities sufficient to undergo polycondensation and provide an amino resin;

(c) adding a hydrophobic core material into the acidic aqueous solution before, during or after step (b) to emulsify and disperse the hydrophobic core material therein; and

(d) encapsulating the hydrophobic core material to form a slurry of microcapsules by polycondensing the amino compound and the aldehyde into an amino resin and depositing the amino resin around the hydrophobic core material to form the slurry of microcapsules.

4,957,667

METHOD OF REDUCING SURFACE DEFECTS IN A POSITIVE DENTAL MODEL

James D. Hamer, White Bear Lake, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Nov. 7, 1988, Ser. No. 268,258

Int. Cl.[5] B28B *7/36*

U.S. Cl. 264—16 **10 Claims**

1. In a method of making a positive model of a tooth or gum comprising the steps of pouring hardenable positive impression material into a negative impression of the tooth or gum comprising a cured, vinyl polysiloxane composition, and hardening the positive impression material, the improvement comprising providing for scavinging of hydrogen gas escaping from the negative impression after pouring of the harden able positive impression material by applying finely divided palladium over at least part of the surface of the negative impression that will contact the positive impression material before pouring the hardenable positive impression material.

4,957,668

ULTRASONIC COMPACTING AND BONDING PARTICLES

Dennis L. Plackard, and William J. Chafin, both of Alexandria, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 7, 1988, Ser. No. 280,926

Int. Cl.[5] B29C *35/08;* **B27N** *1/02;* **H01F** *7/00*

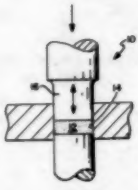
U.S. Cl. 264—23 **9 Claims**

1. A method of substantially concurrently compacting and bonding a plurality of solid particles together into a unified mass having a desired shape and particle content greater than about 70% by volume and the balance substantially binder comprising the steps of:

placing a loose mixture of said particles and a thermobonding agent in a die having said desired shape, said thermobonding agent being selected from the group consisting of thermoplastic and thermosetting materials activateable by heat to bond said particles together;

positioning a punch in said die contiguous said mixture, said punch conforming substantially to said shape;

applying compaction pressure to said mixture with said punch to compact said mixture into said die; and



applying sufficient ultrasonic energy to said mixture while applying said pressure to densify said particles, generate sufficient heat in said mixture to activate said thermobonding agent and effect said bonding.

4,957,669

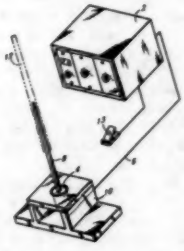
METHOD FOR PRODUCING TUBING USEFUL AS A TAPERED VASCULAR GRAFT PROSTHESIS

Alfred E. Primm, Santa Ana, Calif., assignor to Shiley, Inc., Irvine, Calif.

Filed Apr. 6, 1989, Ser. No. 334,313

Int. Cl.[5] B06B *3/00;* **B29C** *33/60, 61/00*

U.S. Cl. 264—23 **16 Claims**



1. A method for expanding flexible tubing useful for making a vascular prosthesis tubing including the steps of:

energizing an elongated ultrasound horn having a free end which increases from a cross-section smaller than an internal cross-section of said tubing to a cross-section larger than the internal cross-section of the tubing;

placing an end of said tubing on the free end of said horn and guiding said tubing further onto said horn as the horn is vibrating, whereby a portion of said tubing moved onto the larger cross-section of the horn is expanded in cross-section;

de-energizing said horn after said tubing has been expanded;

maintaining said tubing on said horn for a predetermined time period to allow the expanded tubing portion to cool in its expanded state;

removing said tubing from the horn and placing it on a mandrel;

restraining the ends of said tubing in a manner to prevent the tubing from shrinking axially; and

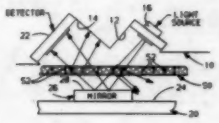
sintering said tubing for a predetermined time at a temperature sufficient to cause the expanded tubing to shrink radially to the shape of the mandrel and to maintain such shape when removed from said mandrel.

4,957,670

METHOD AND APPARATUS FOR PLASTIC INJECTION MOLDING/ENCAPSULATION

Christopher S. Myers, Carlsbad, Calif., and Thomas H. Wozniak, Yardley, Pa., assignors to General Motors Corporation, Detroit, Mich. and Hughes Aircraft Company, Los Angeles, Calif.

Filed Jan. 30, 1990, Ser. No. 472,491
Int. Cl.[5] B29C *45/14, 45/76*
U.S. Cl. 264—40.1 2 Claims



1. A mold apparatus having two mold members defining a mold cavity contained therein for use in a plastic injection molding/encapsulation process in which a glass workpiece is peripherally encapsulated with a plastic material to form a gasket comprising,

a first mold member adapted to sealingly engage a second mold member for shaping said gasket,

a second mold member coacting with said first mold member in a closed position to define the mold cavity for shaping said gasket,

said first mold member having a light source and a detector mounted in recessed areas in a first mold surface adjacent to said mold cavity,

said second mold member having a light reflector mounted in a recessed area of a mold surface opposite to said first mold surface of said first mold member when said two mold members are in a closed position,

said mold cavity being shaped to receive a glass workpiece to peripherally encapsulate said glass workpiece in a plastic material to form the gasket,

means for closing said mold members together and means for receiving said plastic material into said mold cavity,

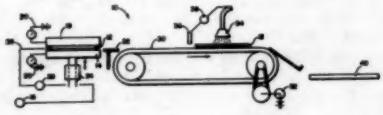
whereby said light source and said detector working in combination with said light reflector are capable of detecting broken glass workpieces in the mold cavity so as to shutdown the plastic injection molding process.

4,957,671

MANUFACTURE OF PLASTIC PRODUCTS

Harold B. Morris, Newnan, Ga., assignor to M. A. Industries, Inc., Peachtree City, Ga.

Filed Jun. 11, 1985, Ser. No. 743,410
Int. Cl.[5] B29C *43/52, 43/58*
U.S. Cl. 264—40.6 8 Claims



1. A method for manufacturing a porous plastic product which comprises:

(a) placing a mold constructed of a light weight highly heat conductive material and containing a moldable plastic material capable f forming a porous product within a press having a pair of platens, said platens being at a temperature above the melt temperature of the plastic material;

(b) closing the press for contact of said platens without applying pressure to said plastic material;

(c) heating the mold to a temperature which is above the melt temperature of the plastic material but below the temperature of said platens;

(d) controlling the temperature of the mold to open the press platens at the proper time such that the mold will have reached a predetermined temperature which will allow the plastic material to continue heating to a temperature which produces the desired porous properties;

(e) opening said press platens and removing the mold from said press prior to said plastic material having reached its melt temperature and at such time as said mold has reached said predetermined temperature;

(f) allowing said plastic material to continue heating to said temperature which produces the desired porous properties; and

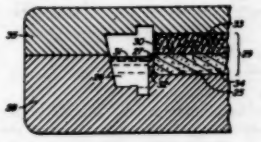
(g) cooling the mold and plastic material to provide a porous plastic product, whereby a 2 to 3 minute cycle per mold is obtained.

4,957,672

METHOD OF FORMING A SEALING GASKET FOR RETICULATED FOAM FILTER

Robert W. Carter, and Robert W. Carter, both of 2745 Yosemite Dr., Belmont, Calif. 94002

Continuation-in-part of Ser. No. 128,832, Dec. 4, 1987, abandoned. This application Mar. 10, 1989, Ser. No. 322,459
Int. Cl.[5] B29C *67/22*
U.S. Cl. 264—45.5 14 Claims



1. A process for bonding a cellular plastic foam formed by frothing reactants to a peripheral region on a reticulated foam article, comprising:

(a) combining said reactants into a mixture;

(b) placing said mixture and said reticulated foam article into a mold cavity without contacting each other, said mold cavity being shaped to avoid distortion of said reticulated foam article in any manner which would restrict fluid flow therethrough from said peripheral region, and to permit contact of said mixture with said peripheral region only upon frothing of said mixture; and

(c) bringing said mixture to a frothing state in which a penetration-preventing skin is formed on the surface thereof, and said mixture is expanded sufficiently to contact said peripheral region, while avoiding any distortion of said reticulated foam article which would restrict fluid flow therethrough from said peripheral region, to bond thereto without penetrating into said reticulated foam article.

4,957,673

MULTILAYER CERAMIC OXIDE SOLID ELECTROLYTE FOR FUEL CELLS AND ELECTROLYSIS CELLS AND METHOD FOR FABRICATION THEREOF

James E. Schroeder, Claremont, Calif., and Harlan U. Anderson, Rolla, Mo., assignors to California Institute of Technology, Pasadena, Calif.

Filed Feb. 1, 1988, Ser. No. 151,172
Int. Cl.[5] C04B *35/48*
U.S. Cl. 264—60 20 Claims

1. A process for forming a composite tape comprising a layer

of dispersed small size stabilized zirconia particles on a layer of agglomerated lanthanum manganite which is operable when fired at a temperature of about 1300° C. for forming a ceramic structure having a first layer of sintered lanthanum manganite having no more than about 70% of theoretical density and, bonded to such first layer, a second layer of sintered stabilized zirconia having at least about 95% of theoretical density without significant migration of manganese from such first layer into such second layer, said process comprising:

(a) presintering lanthanum manganite powder at a predetermined elevated temperature for a predetermined period of time operable for agglomerating said powder thereby forming an agglomerated powder;

(b) lightly crushing said agglomerated powder thereby forming a crushed agglomerate;

(c) mixing said crushed agglomerate with a binder-plasticizer operable when cured for bonding particles of said crushed agglomerate together and a solvent for said binder thereby forming a first slurry, said mixing being operable for degasing said slurry without substantial breakage of said sized agglomerate;

(d) forming a first tape from said first slurry on a molding surface;

(e) while said first tape is on said molding surface, removing solvent from therefrom by evaporation and allowing said binder therein to cure and bond said sized agglomerate therein together thereby forming a bonded first tape;

(f) forming a mixture of small particle size stabilized zirconia powder, a dispersing agent, a second solvent for said dispersing agent, and an anti-cracking agent, said dispersing agent being operable for dispersing said zirconia powder in said mixture;

(g) dispersing said stabilized zirconia powder in said mixture thereby forming a dispersed small size particle second slurry;

(h) forming a second tape from said second slurry on said bonded first tape; and

(i) while said second tape is on said bonded first tape, removing an effective amount of said second solvent from said second tape by evaporation so that said second tape will not run thereby forming a composite tape having an outer surface comprising dispersed small size stabilized zirconia particles, said composite tape being operable when fired at a temperature of about 1300° C. for forming a ceramic structure having a first layer of sintered lanthanum manganite having no more than about 70% of theoretical density and, bonded to such first layer, a second layer of sintered stabilized zirconia having at least about 95% of theoretical density without significant migration of manganese from such first layer into such second layer.

4,957,674

METHOD FOR PRODUCING CALCIUM PHOSPHATE-BASED MATERIAL

Takeshi Ichitsuka; Yasuhiko Hirayama, and Tetsuro Ogawa, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 11, 1988, Ser. No. 192,552

Claims priority, application Japan, May 12, 1987, 62-115180

Int. Cl.[5] C04B *35/64*

U.S. Cl. 264—65 **7 Claims**

1. A method for producing a calcium phosphate-based material comprising:

(a) molding a calcium phosphate powder;

(b) preliminarily calcining the resulting molding in a vacuum or under a reduced pressure until the relative density is 95% or more; and

(c) firing said molding in air, an inert gas, or nitrogen gas, wherein said preliminary calcining is carried out under a pressure of less than 1 Torr and at a temperature of from 950° to 1,100° C.

4,957,675

METHOD AND APPARATUS FOR PREPARING CASEINATES

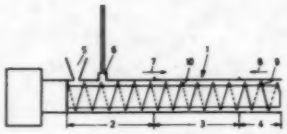
Wolfgang Oelsner, Stuttgart, Fed. Rep. of Germany, assignor to Werner & Pfleiderer GmbH, Fed. Rep. of Germany

Filed Apr. 21, 1989, Ser. No. 341,367

Claims priority, application Fed. Rep. of Germany, May 4, 1988, 3815113

Int. Cl.[5] B29B *9/12*; **B29C** *47/40*

U.S. Cl. 264—118 **11 Claims**



1. Method of preparing caseinates comprising

introducing of casein, alkaline solutions, or basic salts and water into an extruder,

mixing the constituents thoroughly together and

subjecting the mixed components to an increase in pressure and temperature under the influence of return elements,

wherein the pressure build-up under the influence of said return elements or return kneading units takes place directly in front of the discharge end of the extruder and the product is discharged freely through this end of the extruder.

6. An apparatus comprising an extruder having a product feed zone,

preparing caseinates comprising and introducing a casein, alkaline solutions, or basic salts and water into said extruder,

said extruder having a mixing zone for mixing the constituents thoroughly together and subjecting the mixed components to an increase in pressure and temperature under the influence of return elements,

and said extruder including a zone having return elements and a discharge end, wherein the return elements (9) or return kneading units are arranged directly in front of the discharge end (face 13) of the extruder (1) wherein the pressure build-up under the influence of said return elements or return kneading units takes place directly in front of the discharge end of the extruder and the product is discharged freely through this end of the extruder,

and the end of the extruder (1) on the discharge side being open essentially without any reduction in cross-section relative to the free cross-section (D) of the extruder.

4,957,676

DETACHMENT OF TIRES FROM MOLDS

Alan Greenwood, Kent, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Aug. 23, 1989, Ser. No. 397,256

Int. Cl.[5] B29C *33/46*

U.S. Cl. 264—102 **16 Claims**

1. Apparatus for applying vacuum or fluid under pressure to an uncured tire and detaching a cured tire from a heated mold having a first mold section and a second mold section comprising:

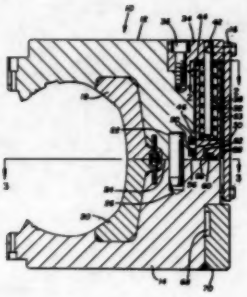
(a) an extendible circular sleeve member slidably mounted on said first mold section having an edge portion with a sealing means for engaging an opposing surface of said second mold section upon extension of said sleeve member;

(b) means for opening said mold to separate said first mold section and said second mold section;

(c) means for simultaneously extending said sleeve member

toward said second mold section to maintain engagement of said edge portion with said opposing surface of said second mold section and sealing the space between said first mold section and said second mold section;

(d) means for communicating said vacuum or said fluid under pressure to said space between said first mold section and said second mold section so that said vacuum will remove gases from said mold and said fluid under pressure



will be communicated to the space between said cured tire and molding surfaces of said first mold section and said second mold section at the center of the tread to peel the tread away from said molding surfaces and push said cured tire away from said molding surfaces; and

(e) stop means for arresting the extension of said sleeve member and retaining said sleeve member on said first mold section.

4,957,677

PROCESS FOR PRODUCING COMPOSITE LAMINATE COMPRISING INSERT PART AND INJECTION-MOLDED PART

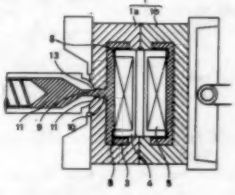
Naoyuki Katoh; Masahiro Aoki, and Takeo Tsukamoto, all of Yokkaichi, Japan, assignors to Mitsubishi Yuka Badische Co., Ltd., Yokkaichi, Japan

Filed Sep. 14, 1988, Ser. No. 244,106

Claims priority, application Japan, Dec. 9, 1987, 62-311731; Dec. 9, 1987, 62-311732; May 9, 1988, 63-112114

Int. Cl.[5] B29C *45/14*; C09D *4/02*

U.S. Cl. 264—135 **7 Claims**



1. A process for producing a composite laminate comprising an insert part and an injection-molded resin part, which comprises coating the insert part with a primer comprising a copolymer aqueous emulsion having a glass transition point of not higher than 20° C. which is obtained by emulsion polymerization of a monomer mixture consisting mainly of (a) from 35 to 75% by weight of an alkyl acrylate having from 1 to 8 carbon atoms in the alkyl moiety thereof, (b) from 10 to 50% by weight of an alkyl methacrylate having from 1 to 4 carbon atoms in the alkyl moiety thereof, (c) up to 15% by weight of styrene and/or acrylonitrile, the sum of the (b) and (c) components ranging from 15 to 55% by weight, (d) up to 5% by weight of a vinyl monomer selected from the group consisting of an α,β-unsaturated acid or an anhydride thereof, 2-hydroxyethyl (meth)acrylate, 2-hydroxypropyl (meth)acrylate, (meth)acrylamide, and methylol(meth)acrylamide, and (e) up to 30% by weight of other vinyl monomer(s), drying the primer, inserting the insert part into a cavity of an injection mold, injecting a molten resin into the cavity to thereby form the injection-molded resin part and unite the insert part and the injection-molded resin part into one body.

4,957,678

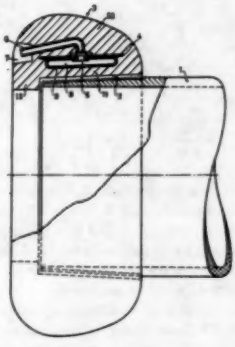
METHOD OF MOLDING A PIPE END PROTECTOR

Peter Budde, Waterleidingstraat 1, 3134 KC Vlaardingen, Netherlands

Division of Ser. No. 83,784, Aug. 21, 1987, Pat. No. 4,854,350. This application Mar. 13, 1989, Ser. No. 322,423

Int. Cl.[5] B29C *39/10*

U.S. Cl. 264—135 **6 Claims**



1. A method for manufacturing a pipe-end protector of the type having a unitary molded plastic body defining a bore for receiving the pipe-end to be protected, an expandable cavity in said body, a filling duct having an exteriorly accessible outer end in a depression formed in an end face of said body and opening into said cavity through a hole in said ring for pressurizing said cavity thereby to clamp said plastic body abut said pipe-end, comprising the steps of:

centering said ring by means of said filling duct in a casting mold, covering said hole with flexible means attached to said ring for defining said expandable cavity, maintaining said outer end of said filling duct in communication with the ambient air, and then introducing into said casting mould said plastic for forming said body.

4,957,679

METHOD OF MAKING INTERFOLDED SHEETS OF PLASTIC FILM

Neal E. Moore, Dublin, Calif., assignor to James River II, Inc., Oakland, Calif.

Filed Jul. 24, 1989, Ser. No. 384,202

Int. Cl.[5] B29C *53/04, 69/00*

U.S. Cl. 264—152 **8 Claims**

1. A method of producing interfolded sheets of plastic film containing at least eighty percent high density polyethylene comprising cutting a continuous length of the film with a knife blade into separate sheets and interfolding the sheets, the improvement wherein the film contains from about one to about twenty percent of a styrene polymer selected from the group consisting of polystyrene, poly(p-methylstyrene), rubber-modified polystyrene, and rubber-modified poly(p-methylstyrene), whereby the sheets are more completely cut by the blade

and thereby more completely and consistently separated from adjacent sheets.

4,957,680

PROCESS OF MOLDING SEAL RINGS

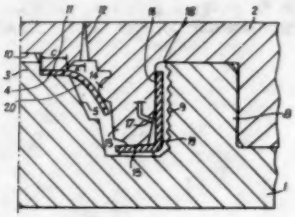
Michel Saxod; Serge Devoussoux, both of Lagres; Michel Marchiset, Chalindrey, and Jean-Pierre Jaumot, Langres, all of France, assignors to Procal, Langres, France

Filed Apr. 2, 1986, Ser. No. 847,330

Claims priority, application France, Apr. 3, 1985, 85 05054

Int. Cl.[5] B29C *45/14, 45/22, 45/38*

U.S. Cl. 264—161 5 Claims



1. A process of molding a seal ring comprising, the steps of; positioning a reinforcement in a first mold part, positioning a disc of low friction material in the first mold part, closing the mold with a second mold part to clamp a width C of between about 30% and 70% of the width of the disc between opposed clamping surfaces of the first and second mold parts, drawing a vacuum in the interior of the mold, injecting a plastic material into the mold to form a seal lip connecting the disc of low friction material to the reinforcement, opening the mold and removing the molded ring, and cutting off from the molded ring, an excess portion of the molded lip, and at least that portion of the disc which was clamped between the opposed clamping surfaces of the mold wherein said injecting step comprises injecting the plastic material through circumferentially spaced injection channels on the second mold,

said injection channels being spaced radially from the portion of said disc which is clamped between the clamping surfaces of the mold parts.

4,957,681

PREPARATION OF PHARMACEUTICAL MIXTURES

Roger Klimesch, Alsbach-Haehnlein; Gerhard Bleckmann, Lampertheim, and Lothar Schlemmer, Maxdorf, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Apr. 3, 1989, Ser. No. 331,959

Claims priority, application Fed. Rep. of Germany, Apr. 15, 1988, 3812567

Int. Cl.[5] B29C *47/00, 47/60*

U.S. Cl. 264—211.23 3 Claims

1. A continuous process for the preparation of a pharmaceutical mixture having at least two components, wherein the components of the mixture are continously metered which comprises:

(a) continuously metering the individual components of the pharmaceutical mixture at a rate of at least 50 g/h on electronic differential metering balances having a metering accuracy of at least ±5% within time intervals less than 1 minute and having screw conveyors, thereby obtaining a substantially uniformly metered mixture, and

(b) shaping said mixture.

4,957,682

METHOD OF INJECTION MOLDING A THREE-LAYERED CONTAINER

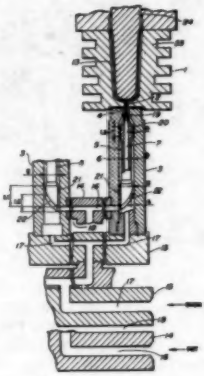
Hidenori Kobayashi; Moriaki Suwabe; Nobuhiro Inakazu, and Hatsuo Nagamatsu, all of Tokyo, Japan, assignors to Kamaya Kagaku Kogyo Co., Ltd., Tokyo, Japan

Filed Jan. 17, 1989, Ser. No. 298,122

Claims priority, application Japan, Jan. 19, 1988, 63-9209; Apr. 1, 1988, 63-80448; Jun. 2, 1988, 63-136547

Int. Cl.[5] B29C *45/16*

U.S. Cl. 264—255 3 Claims



1. A method for manufacturing a three-layered container by injection molding, the method comprising the sequential steps of:

(a) preparing an injection molding apparatus adapted for injecting a first resin through an outer injection nozzle and a second resin through an inner injection nozzle disposed in the outer injection nozzle;

(b) injecting the first resin from the outer injection nozzle;

(c) ceasing injecting the first resin from the outer injection nozzle;

(d) injecting the second resin from the inner injection nozzle after pausing a first predetermined period of time after step (c); and

(e) injecting the first resin from the outer injection nozzle after a second predetermined period of time has elapsed after the start of step (d).

4,957,683

PROCESS FOR PRODUCING A PIPE SECTION AND COMPOUND PIPE PRODUCED ACCORDING TO THIS PROCESS

Peter Hartmann, General-Willestrasse 115, Feldmeilen, Switzerland

Continuation of Ser. No. 687,016, Dec. 28, 1984, abandoned. This application Feb. 5, 1987, Ser. No. 11,442

Claims priority, application Switzerland, Jan. 19, 1984, 243/84

Int. Cl.[5] B28B *1/20*

U.S. Cl. 264—256 8 Claims

1. A process for producing pipe sections in a rotary mold drum comprising:

rotating the rotary mold drum to provide centrifugal forces to an inner mold drum surface and during rotation performing the steps of:

introducing onto the inner mold drum surface a protective layer of moldable plastic in a liquid state, said moldable plastic being free of fiber reinforcing material;

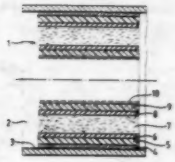
allowing said moldable plastic to cure to a hardened state by addition of a hardening agent;

applying a first reinforcing layer of fiber-reinforced plastic in a liquid state to said hardened protective layer;

applying a first connecting layer of fiber free plastic in a liquid state to the first reinforcing layer;

allowing said first connecting layer to cure to a partially hardened pasty state by addition of a hardening agent;

applying a central layer of inorganic material to the first connecting layer while the first connecting layer is in said partially hardened pasty state;



allowing said central layer of inorganic material to partially set;

applying a second connecting layer of fiber free plastic in a liquid state to be the central layer of inorganic material after the central layer of inorganic material is partially set;

allowing said second connecting layer to cure to a partially hardened pasty state by addition of a hardening agent; and

applying a second reinforcing layer of fiber-reinforced plastic in a liquid state to said partially hardened pasty second connecting layer.

4,957,684

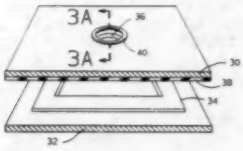
SOFT MOLDING METHOD

Hamid G. Kia, Utica, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 4, 1988, Ser. No. 267,359

Int. Cl.[5] B29C *45/16, 43/20*

U.S. Cl. 264—257 **7 Claims**



1. In a method of compression molding glass fiber mat reinforced plastic panels having at least one appearance surface in a set of two matched mold member of which at least one member having an interior mold surface being the mirror image of the appearance surface of said panel, of the type wherein at least one glass fiber mat is first placed in the mold cavity defined by the interior mold surfaces of said mold members and a polymeric material is introduced into the cavity saturating said mat and curing into a panel under heat and pressure transmitted through said mold members clamped together, the improvement comprising

placing at least one layer of a reusable flexible sheeting material immediately adjacent to the interior mold surface opposing the mold surface produces the appearance surface of said molded panel prior to clamping the two mold members together and applying pressure on said mold members whereby said at least one layer of flexible sheeting material acts as a stress relief layer to prevent the formation of fiber readout defects and remains in said mold members after the compression molding process.

4,957,685

METHOD OF MAKING A TRANSPORTABLE BRICK PANEL

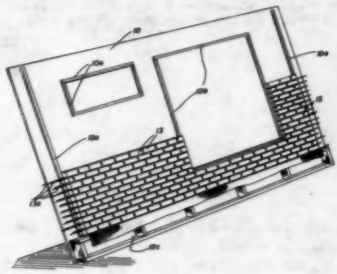
Phillip H. Boot, Sydney, Australia, assignor to Panelbrick Industries PTY. Limited, New South Wales, Australia

Continuation of Ser. No. 40,830, Apr. 21, 1987, abandoned. This application Jul. 19, 1989, Ser. No. 383,269

Claims priority, application Australia, Apr. 23, 1986, PH5586

Int. Cl.[5] B29C *33/58, 39/10, 39/12*

U.S. Cl. 264—261 **12 Claims**



1. A method of making a transportable brick panel, said method comprising the steps of:

setting out a mold on which a brick panel is to be formed, said mold including a substantially flat bottom surface;

laying a soft deformable membrane, for preventing contamination by particles of the overall surface areas of rough-surfaced brick faces, over said bottom surface, wherein said membrane restricts particles from passing therethrough and being such as to form a seal around face edges of bricks placed on said membrane to thereby prevent fine cementitious particles in mortar placed between said bricks from contaminating said overall surface areas of said rough-surfaced faces of said bricks and to thereby inhibit movement of bricks placed on said membrane;

arranging courses of brickwork in said mold on said membrane to have the weights of said bricks supported by said soft deformable membrane so that portions of said brick faces in contact with said membrane exert pressure on said membrane to thereby cause a deformation in deform said membrane due to a sudden release of pressure beyond the edges of said bricks, said deformed membrane rotating around said edges of said bricks in a hinge action so as to stabilize said bricks relative to said mold and to seal the face edges of said bricks with said deformed membrane, individual bricks being substantially evenly spaced apart with spaces between them for receiving liquid mortar in said spaces;

arranging reinforcing bars to pass through aligned holes in columns of said bricks so as to structurally extend through to the top and bottom courses of said bricks;

pouring liquid mortar to fill said spaces between said individual bricks and penetrate holes in said bricks;

allowing said mortar to set thereby forming said brick panel; and

lifting said brick panel so formed from said mold.

4,957,686

USE OF BACTERIOPHAGES TO INHIBIT DENTAL CARIES

Alan H. Norris, 120 Saddle Mountain Rd., Rome, Ga. 30161

Filed Feb. 6, 1990, Ser. No. 473,888

Int. Cl.[5] A61K *7/16, 9/68, 39/02*

U.S. Cl. 424—50 **10 Claims**

1. A method of improved dental hygiene comprising introducing into the mouth bacteriophages parasitic to bacteria

which possess the property of readily adhering to the salivary pellicle, said bacteria so providing receptor sites for other bacteria and so allowing a build up of plaque on the teeth.

4,957,687

METHOD FOR MAKING PROFILED PLASTIC TUBES SUCH AS CORRUGATED TUBES

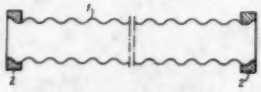
Bulent Akman, Ruelle de la Poterne, and Bernard de Curraize, 10, rue Barbier D'Aucourt, both of 52244 Langres, France

Filed Nov. 7, 1984, Ser. No. 668,947

Claims priority, application France, Nov. 7, 1983, 83 17639

Int. Cl.[5] B28B *7/20*; **B29C** *49/00, 61/00*; **B29D** *23/00*

U.S. Cl. 264—506 **12 Claims**



1. A method of making profiled hollow bodies from a plastic material having memory return characteristics upon heating comprising the steps of positioning a tube of memory characteristic plastic material in a hollow mold body having an internal surface corresponding to the desired external profile shape of the tube, applying internal fluid pressure to the tube while the tube is at a temperature above its softening point to deform the tube against the inner surface of the mold body, cooling the tube while within the mold body and while maintaining the internal pressure, releasing the internal pressure after cooling, removing the tube from the mold body by pulling the tube axially out of the mold body, and then heating the tube to a temperature sufficient to cause the memory characteristics of the plastic material to return the tube to substantially the same profile as the internal surface of the mold body, to thereby substantially eliminate the stretching and deformations caused by pulling the tube out of the mold body.

4,957,688

SYSTEM FOR THE TRANSMISSION OF VIDEO SIGNALS WITH ADAPTIVE CODE WORD ALLOCATION, AND ALSO A TRANSMITTER AND A RECEIVER SUITABLE FOR THE SYSTEM

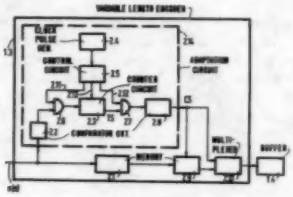
Peter H. N. De With, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 21, 1989, Ser. No. 326,577

Claims priority, application Netherlands, Apr. 15, 1988, 8800988

Int. Cl.[5] H04N *7/12*

U.S. Cl. 358—133 **12 Claims**



1. A system for the transmission of a video signal from a transmitter to a receiver in a digitized form obtained by means of differential pulse code modulation (DPCM), the transmitter including a differential pulse code modulator which produces an output signal consisting of signal words, the signal words additionally being submitted in a variable-length encoding circuit to a variable-length coding operation, to generate variable-length code words, and the receiver including a variable-length decoder circuit to convert the received variable-length code words into signal words of a fixed length which are in addition applied to a differential pulse code demodulator, characterized in that the variable-length encoding circuit in the transmitter comprises:

means for defining contiguous signal segments, each consisting of a sequence of consecutive signal words,

means for defining for each signal segment a reference set consisting of a number of reference words which are related to a number of signal words which are predetermined relative to the signal segment and are correlated with the signal words of the signal segment;

means for determining a statistical quantity from the reference set thus formed and for generating a coding book signal under the control thereof;

means for selecting under the control of said codingg book signal a coding book from a fixed set of coding books;

means for converting for each signal segment the signal words in accordance with the selected code book into variable-length code words; and that the variable-length decoder circuit in the receiver comprises:

means for generating for each received signal segment a decoder book signal from the received signal which corresponds to the coding book signal generated in the transmitter for the relevant signal segment;

means for selecting a decoder book from a fixed set of decoder books under the control of said decoder book signal;

means for converting for each received signal segment the variable-length code words in accordance with the selected decoder book into signal words.

4,957,689

SCANNING AND PRINTING APPARATUS

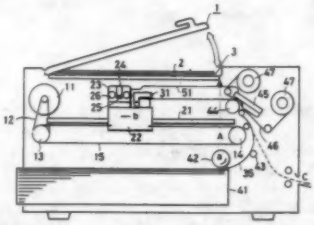
Masaru Ohnishi, and Masashi Tamura, both of Kamakura, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 17, 1989, Ser. No. 422,690

Claims priority, application Japan, Oct. 24, 1988, 63-267355; Nov. 7, 1988, 63-280591; Mar. 9, 1989, 64-54911

Int. Cl.[5] H04N *1/23, 1/10, 1/032*; **G01D** *15/28*

U.S. Cl. 358—296 **20 Claims**



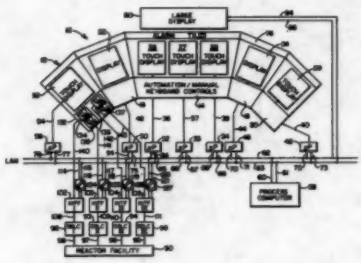
15. A scanning and printing apparatus for flatbed scanning of documents and printing of document images on a recording medium, said apparatus comprising: means for scanning a document and converting an image thereon into an electrical signal, means for driving said scanning means with linear and reciprocal motion, clamping means coupled to an reciprocally moved by said driving means for holding the recording medium to thereby move the recording medium in a reciprocal manner, and printing means for printing an image on said recording medium as said recording medium is moved by said clamping means.

4,957,690

SYSTEM AND METHOD FOR MONITORING AND CONTROL OF SAFETY-RELATED COMPONENTS OF A NUCLEAR POWER PLANT

Larry E. Fennern, San Jose, Calif., assignor to General Electric Company, San Jose, Calif.

Filed Dec. 7, 1988, Ser. No. 280,800
Int. Cl.[5] G21C 7/36
U.S. Cl. 376—216 22 Claims



1. In a nuclear power plant installation of a variety having a controllable nuclear reactor, normal operational control means having monitor outputs and responsive to control inputs for effecting nominal mode control over said reactor, divisional operational control means including at least two independent divisions having qualified safety system logic monitoring and control devices for providing safety status parameter outputs and responsive to select safety directed inputs for providing safety mode control over said reactor, an operator manned control region including a console having an operator interface for the assertion of said control inputs and initiation of said safety directive inputs, the improved control method comprising the steps of:

providing a display at said console responsive to display inputs to generate operator readable information;

providing an interface network within each said division having a communications link input means for receiving said operator initiated safety directive inputs in binary format, a non-volatile memory, a display controller, input and output ports, and a logic control means for controlling said memory, display controller, communication link input means and said input and output ports;

providing isolated communications link means between said link input means and said operator interface for transmitting said initiated safety directive inputs to said communications link input means;

providing a directive communication link between said output port and said safety system logic, monitoring, and control devices;

providing a library collection of accessable predetermined valid said safety directive inputs in binary format within said memory;

responding with said logic control means to a said received operator initiated safety directive input by accessing said memory for a corresponding said valid said safety directive;

effecting transmission of said accessed valid safety directive by said logic control means and said display controller to said display to generate operator readable information descriptive thereof; and

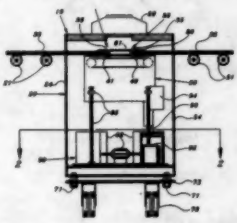
effecting transmission by said logic control means of only said accessed valid safety directive from said output port through said directive communications link to said safety system control devices.

4,957,691

APPARATUS FOR INSPECTING THE QUALITY OF NUCLEAR FUEL ROD ENDS

Raymond W. Brashier, Columbia, S.C., and Edward D. Pfau, Bostic, N.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 30, 1989, Ser. No. 359,000
Int. Cl.[5] G21C 17/06
U.S. Cl. 376—245 10 Claims



7. An apparatus for inspecting the quality of both ends of nuclear fuel rods and comprising

a housing including a pair of longitudinally separated slots for receiving X-rays downwardly therethrough from an external source and so as to define first and second longitudinally spaced apart operating positions,

means for serially guiding nuclear fuel rods longitudinally through said housing and to a first rod position wherein the forward ends of the rods are aligned below said first operating position and to a second rod position wherein the rear ends of the rods are aligned below said second operating position,

belt conveyor assembly means for serially advancing X-ray film cartridges longitudinally through said housing and below said rods, and so that each cartridge may be selectively aligned below said first and second operating positions, said belt conveyor assembly means including a conveyor frame having two opposing side wall surfaces, at least two laterally directed support rods rotatably mounted to said opposing side wall surfaces, at least two endless conveyor belts entrained about said support rods in spaced relation to each other, at least three longitudinally spaced apart cleats mounted on each conveyor belt and so as to define first and second film cartridge receptacles extending transverse to said belts and between respective pairs of cleats so that said belts support a film cartridge positioned thereon, drive means supported by said conveyor frame and operatively engaging select ones of said support rods for selectively advancing said conveyor belt in opposite directions, and table means supported by said conveyor frame for selectively lifting the film cartridges supported by said belts and so that the conveyor belts may be advanced while the film cartridges are held stationary,

whereby film cartridges may be serially advanced through said housing and exposed to X-rays at each of said first and second operating positions and so that each film cartridge is adapted to image each end of a given fuel rod, by initially positioning each cartridge in said first receptacle, moving the conveyor belts so that said first receptacle and cartridge are positioned in alignment with said first operating position, moving the film cartridge to said second receptacle by lifting the same from said conveyor belts while advancing the conveyor belts rearwardly, and then moving the second receptacle and cartridge into alignment with said second operating position.

4,957,692

APPARATUS FOR HANDLING A FUEL ELEMENT SKELETON

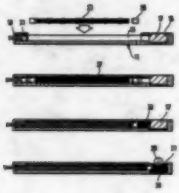
Helfrid Lahr, Wedemark, and Bernd Pontani, Alzenau, both of Fed. Rep. of Germany, assignors to Deutsche Gesellschaft für Wiederaufarbeitung von Kernbrennstoffen mbH, Hanover, Fed. Rep. of Germany

Division of Ser. No. 249,964, Sep. 27, 1988, Pat. No. 4,923,668. This application Nov. 20, 1989, Ser. No. 438,025

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1987, 3733387; Feb. 2, 1988, 3802966

Int. Cl.[5] **G21C** *19/00*

U.S. Cl. 376—260 **3 Claims**



1. A ram-type press apparatus for compacting a fuel element skeleton of an irradiated nuclear reactor fuel element from which the fuel rods have been removed, the fuel element skeleton having a predetermined uncompacted length, the ram-type press comprising:

an elongated housing having a compacting shaft for receiving the uncompacted fuel element skeleton therein;

said compacting shaft having first and second longitudinal open ends;

a removable pres base part;

said housing having a seat formed therein directly adjacent said first longitudinal open end for accommodating said press base part therein;

a ram displaceably mounted in said housing so as to be movable through said second longitudinal open end and into said compacting shaft for compacting the fuel element skeleton against said press base part to form a compacted skeleton packet; and,

a transfer shaft having a receiving space therein for accommodating the compacted skeleton packet and being placeable into aid seat after removal of said press base part, said transfer shaft having a receiving opening facing and aligned with said first longitudinal open end when disposed in said seat; and,

said ram being displaceably mounted so as to be further displaceable into said compacting shaft for pushing the compacted skeleton packet out of said compacting shaft and into said receiving space of said transfer shaft.

4,957,693

PRESSURIZED WATER NUCLEAR REACTOR SYSTEM WITH HOT LEG VORTEX MITIGATOR

Louis K. S. Lau, Monroeville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 3, 1989, Ser. No. 293,160

Int. Cl.[5] **C21C** *9/00*

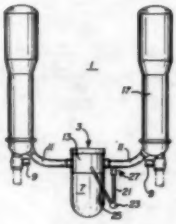
U.S. Cl. 376—298 **7 Claims**

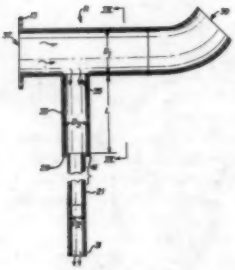
7. In a pressurized water nuclear reactor system having a reactor pressure vessel, at least one steam generator, a hot leg conduit for charging of hot fluid from the reactor pressure vessel to said steam generator, and at least one cold leg conduit for return of cool fluid from the steam generator back to said reactor pressure vessel, the improvement comprising a residual heat removal device wherein:

said hot leg has an inside diameter D_1;

a first section of residual heat removal conduit is provided, having an inside diameter D_2, a first end for receipt of fluid from said hot leg, and a second end;

a second section of residual heat removal conduit is provided connected to said reactor pressure vessel;





a pump interconnects the second end of said first section of residual heat removal conduit with said second section of residual heat removal conduit; and

a step nozzle of an inside diameter D_3 and a length L interconnects said hot leg to the first end of said first section of residual heat removal conduit, with $D_3/D_1 \geq 0.55$, with $D_3/D_2 1.9$ and $L/D_3 \cong 1.44$.

4,957,694

REMOVAL OF OBSTRUCTIONS IN THIMBLES OF NUCLEAR POWER REACTORS

Haydn C. Doughty, Bourbonnais, Ill., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 277,830, Nov. 30, 1988, Pat. No. 4,885,124. This application Sep. 28, 1989, Ser. No. 414,160

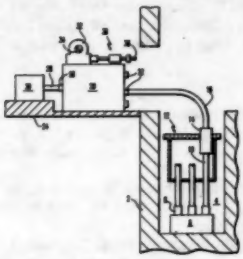
Int. Cl.[5] **G21C** *19/00*

U.S. Cl. 376—310 **5 Claims**

1. In the operation of a power reactor having a pressure vessel containing a core and a plurality of thimbles extending into the core to provide passages for a flux detector, a movable support member located outside of the pressure vessel and carrying a plurality of tubular members each detachably connected to a respective thimble, and transfer means normally coupled to the tubular members for introducing a flux detector into a selected thimble via a respective tubular member, a method for removing obstructions from a selected thimble while the reactor remains in operation, said method comprising:

disconnecting at least the respective tubular member from the transfer means;

introducing an obstruction removal device into the respective tubular member; and



advancing the obstruction removal device through the respective tubular member and into the selected thimble to the location of the obstruction.

4,957,695

NUCLEAR REACTOR FUEL ASSEMBLY

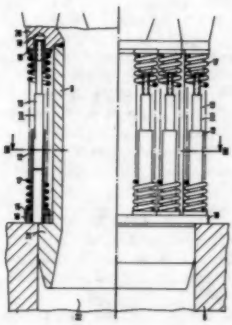
Matthias Rudolph, Weisendorf, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Continuation of Ser. No. 149,545, Jan. 28, 1988, abandoned. This application Dec. 4, 1989, Ser. No. 449,365

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1987, 3702506

Int. Cl.[5] G21C *1/01, 3/32*

U.S. Cl. 376—364 **6 Claims**



1. In a nuclear reactor having a support structure, the improvement comprising a nuclear reactor fuel assembly having a plurality of fuel rods filled with nuclear fuel, and a fuel assembly base having a longitudinal axis, a jacket, first and second shoulders on the outside of said jacket, a resilient support element in the form of a shock-absorbing telescopic leg being parallel to said longitudinal axis and clamped between said shoulders on the outside of said jacket, said shock-absorbing telescopic leg having an upper end engaging said first shoulder and a lower end displaceable in longitudinal direction, and a ring connected to said lower end of said shock-absorbing telescopic leg, said ring being seated on said fuel assembly base coaxially with said longitudinal axis and being displaceable relative to and in longitudinal direction of said fuel assembly base, said ring forming a contact surface for mounting said ring on the support structure, and said second shoulder forming a stop surface for said lower end of said shock-absorbing telescopic leg.

4,957,696

FUEL ELEMENT ROD FOR A WATER-COOLED NUCLEAR REACTOR

Roger L. Mareschal, Sainte Genevieve des Bois, and Pierre Mauny, Jouy en Josas, both of France, assignors to Commissariat a l'Energie Atomique, France

Filed Nov. 9, 1989, Ser. No. 434,879

Claims priority, application France, Nov. 22, 1988, 88 15155

Int. Cl.[5] G21C *3/00*

U.S. Cl. 376—419 **1 Claim**

1. Fuel element rod for pressurized water-cooled nuclear reactor, having a cylindrical can (2) made from an alloy transparent to neutrons and sealed at each of its ends by a plug (3, 4), namely upper plug (3) and lower plug (4), and having a first portion in which are stacked fuel material pellets (6) and a second portion or expansion chamber (5) containing a compressed spring (9) bearing at one end on the upper plug (3) and at the other end on the fuel pellet stack (6) which it maintains in position, characterized in that the spring is used both for maintaining in place the pellets and for compensating the absorption of the neutrons in said expansion chamber and it is made from hafnium.

4,957,697

NUCLEAR FUEL ROD SUPPORT GRID WITH GENERALLY S-SHAPED SPRING STRUCTURES

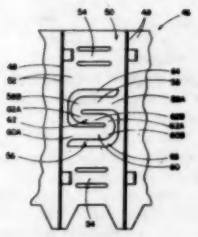
Norio Wada, Ibaraki, Japan, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 6, 1988, Ser. No. 241,427

Claims priority, application Japan, Sep. 10, 1987, 62-227169

Int. Cl.[5] G21C *3/34*

U.S. Cl. 376—442 **15 Claims**



1. In a nuclear fuel rod grid including a plurality of inner and

outer straps being interleaved with one another to form a matrix of hollow cells, each cell for receiving one fuel rod and being defined by pairs of opposing wall sections of said straps which wall sections are shared with adjacent cells, each cell having a central longitudinal axis, a fuel rod engaging spring structure of resiliently yieldable material being integrally formed on each wall section of said inner straps, said spring structure comprising:

(a) a pair of spaced apart opposite outer portions, each outer portion having an inner end and an outer end, said inner and outer ends of one outer portion being located the reverse of said inner and outer ends of the other outer portion, said outer portions being integrally attached only at their outer ends to said respective wall section so as to define a pair of opposite ends of said spring structure being the only locations at which said spring structure is attached to said respective wall section, said outer portions extending in generally transverse relation to the direction of said central longitudinal axis of said one cell; and

(b) a middle portion having a pair of outer ends and being disposed between and in laterally spaced relation from said outer portions, said middle portion being integrally connected at its outer ends with respective inner ends of said outer portions and extending in generally transverse relation to the direction of said central longitudinal axis of said one cell;

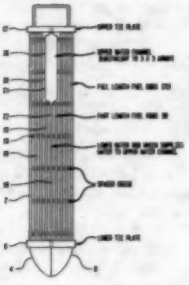
(c) said inner ends of said outer portions and said outer ends of said middle portion having generally arcuate configurations.

4,957,698

ADVANCED BOILING WATER REACTOR FUEL ASSEMBLY DESIGN

Gerald L. Ritter, Richland, Wash., assignor to Advanced Nuclear Fuels Corporation, Bellevue, Wash.

Filed Feb. 17, 1989, Ser. No. 312,553
Int. Cl.[5] G21C *3/32*
U.S. Cl. 376—444 **3 Claims**



1. A fuel assembly for a boiling water nuclear reactor comprising;

an outer flow channel;

a plurality of fuel rods within said outer flow channel and parallel thereto, some of said fuel rods extending the full length of said outer flow channel;

an inner flow channel positioned among said fuel rods and generally parallel thereto, said inner flow channel being so constructed and arranged as to admit water at its lower end and to permit water to flow substantially the entire length thereof, said inner flow channel comprising a lower portion having a substantially uniform cross section and an upper portion having a substantially uniform cross section substantially greater than that of said lower portion;

said upper portion comprising a plurality of branches connected to the upper end of said lower portion;

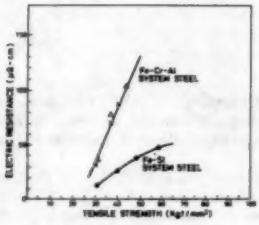
and a plurality of partial-length fuel rods adjacent to said lower portion of said inner flow channel and extending substantially from the bottom of said assembly to the lower end of said upper portion of said inner flow channel.

4,957,699

SOFT MAGNETIC CR-AL STEEL

Yoshinobu Honkura; Hideki Fujii, and Koji Murata, all of Aichi, Japan, assignors to Aichi Steel Works Ltd., Aichi, Japan

PCT No. PCT/JP88/00084, § 371 Date Apr. 28, 1989, § 102(e) Date Apr. 28, 1989, PCT Pub. No. WO89/00210, PCT Pub. Date Jan. 12, 1989
PCT Filed Jan. 29, 1988, Ser. No. 217,001
Claims priority, application Japan, Jun. 30, 1987, 62-162929
Int. Cl.[5] C22C *38/06, 38/18*
U.S. Cl. 420—41 **4 Claims**



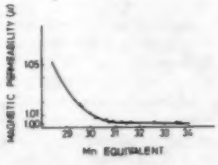
4. A soft magnetic steel consisting by weight, of 0.015% or lower C+N, 0.20% or lower Si, 0.20% or lower Mn, 7 to 13% Cr, 2 to 5% Al, 0.08% or lower Ti, at least one of the ingredients selected from 0.050% or lower S, 0.050% or lower Se, and 0.030% or lower Pb; together with 0.20% or lower Zr and/or 0.030% or lower Te, and the balance of Fe with impurities having a tensile strength of 44 Kbf/mm^2 or lower, a limiting workability of 60% or higher, a coercive force of 0.7 Oe or lower, a magnetic flux density of 13,000 G or higher, a magnetic response with relaxation time of 0.7 msec or shorter, and an electric resistance of 90 μΩ•cm or higher.

4,957,700

HIGH STRENGTH NON-MAGNETIC STAINLESS STEEL

Yoshinobu Honkura, Kounan; Toru Matsuo, and Kouji Murata, both of Tokai, Japan, assignors to Aichi Steel Works, Ltd., Aichi, Japan

Continuation of Ser. No. 222,382, Jul. 19, 1988, abandoned, which is a continuation of Ser. No. 006,241, Jan. 20, 1987, abandoned, which is a continuation of Ser. No. 714,044, Mar. 18, 1985, abandoned. This application Jul. 5, 1989, Ser. No. 376,907
Claims priority, application Japan, Mar. 20, 1984, 59-53695
Int. Cl.[5] C22C *38/58*
U.S. Cl. 420—59 **22 Claims**



1. A high strength non-magnetic stainless steel consisting essentially of, by weight, not more than 0.20% carbon, not

more than 1.00% silicon, 14–15.76% manganese, not more than 0.003% sulfur, 0.2–1.0% nickel, 15–19% chromium, 0.30–0.40% nitrogen, said carbon and said nitrogen in total constituting 0.40–0.55% and the manganese equivalent being 30–33, the remainder being iron together with impurities,

said steel having a magnetic permeability of less than 1.01 after processing.

4,957,701

HIGH-STRENGTH HIGH-CR FERRITIC HEAT-RESISTANT STEEL

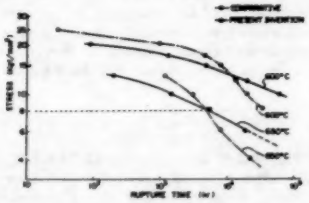
Fujimitsu Masuyama; Takashi Daikoku, both of Nagasaki; Hisao Haneda, Tokyo; Kunihiko Yoshikawa, Amagasaki; Hiroshi Teranishi, Amagasaki, and Atsuro Iseda, Amagasaki, all of Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka and Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, both of, Japan

Division of Ser. No. 917,502, Oct. 10, 1986, Pat. No. 4,799,972. This application Aug. 15, 1988, Ser. No. 232,227

Claims priority, application Japan, Oct. 14, 1985, 60-226993; Oct. 14, 1985, 60-226994

Int. Cl.[5] **C22C** *38/22, 38/26, 38/24*

U.S. Cl. 420—69 **3 Claims**



1. A high-strength high-Cr ferritic, heat-resistant steel exhibiting improved high-temperature, long-term creep strength which corresponds to a creep rupture time of at least 2600 hrs., measured in an accelerated creep test carried out at conditions of 650° C.×8 kgf/mm², which consists essentially of, by weight %:

C: 0.05–0.15%,	Si: not more than 1.0%,
Mn: 0.2–1.0%,	P: not more than 0.025%,
S: not more than 0.015%,	Ni: not more than 0.8%,
Cr: 8.0–13%,	Mo: 0.5–3%,
W: 0.5–3.0%,	sol. Al: 0.005–0.04%,
N: 0.02–0.07%,	V: 0.1–0.4%,
Nb: 0.01–0.05%,	
B: 0–0.02%,	

at least one of Ca, Ti, Zr, Y, La, and Ce each in an amount of : 0–0.2%, and

the balance Fe and incidental impurities, the A_{c1} point defined by Formula (1) below being 850° C. or higher, and the Cr-equivalent defined by Formula (2) below being 17 or less.

$$A_{c1}\ (°C.) = 765 - 500C - 450N + 30Si - 25Mn + 25Mo + 15W + 11Cr + 50V + 30Nb - 30Ni + 30 \text{ sol. Al(weight \%)} \quad (1)$$

$$\text{Cr-equivalent} = Cr - 40C - 30N + 6Si - 2Mn + 4Mo + 1.5W + 11V + 5Nb - 4Ni + 12 \text{ soln. Al} \quad (2)$$

4,957,702

AIR-COOLING DUPLEX BAINITE-MARTENSITE STEELS

Hongsheng Fang; Yankang Zheng; Xiuyun Chen; Donghao Chen, and Rufa Zhao, all of Beijing, China, assignors to Qinghua University, Beijing, China

Filed Dec. 12, 1988, Ser. No. 283,491

Claims priority, application China, Apr. 30, 1988, 88102230

Int. Cl.[5] **C22C** *38/32*

U.S. Cl. 420—104 **31 Claims**

1. A steel having a duplex bainite-martensite microstructure upon air-cooling after casting or hot working, and consisting essentially, by weight percent, of:

carbon	0.15 to 0.70
manganese	2.1 to 3.5
silicon	0.1 to 2.0
boron	0.0005 to 0.005
chromium	over 1% to 2.0
tungsten	up to 1.5
molybdenum	up to 1.5
vanadium	up to 0.15
sulfur	up to 0.2
calcium	up to 0.1
titanium	up to 0.1
rare earth elements	0 to 0.2 total
iron	balance, except for incidental steelmaking impurities,

wherein the combined manganese and silicon content is at least about 3%; silicon is at least about 0.6% when carbon is less than about 0.5%, and the steel has a hardenable diameter of at least 35 mm.

4,957,703

PRECIPITATION-HARDENABLE NICKEL-BASE SUPERALLOY WITH IMPROVED MECHANICAL PROPERTIES IN THE TEMPERATURE RANGE FROM 600 TO 750 DEGREES CELSIUS

Peter Lawrence, Soulbury, England; Mohamed Nazmy, Fislisbach, and Markus Staubli, Dottikon, both of Switzerland, assignors to Asea Brown Boveri Ltd., Baden, Switzerland

Filed Mar. 2, 1989, Ser. No. 318,181

Claims priority, application Switzerland, Mar. 2, 1988, 755/88

Int. Cl.[5] **C22C** *19/05*

U.S. Cl. 420—448 **7 Claims**

1. A precipitation-hardenable nickel-base superalloy with improved mechanical properties in the temperature range from 600 to 750°C, consisting essentially of:

Cr=12–15 percent by weight

Co=3–4.5 percent by weight

W=1–3.5 percent by weight
Ta=4–5.5 percent by weight
Al=3–4.3 percent by weight
Ti=4–5 percent by weight
Hf=0–2.5 percent by weight
B=0–0.02 percent by weight
Zr=0.01–0.06 percent by weight
C=0.05–0.07 percent by weight
Ni=remainder.

4,957,704

METHOD OF CORROSION INHIBITION USING HYDROCARBYL POLYCARBOXYLATES COMPOSITIONS

Brent R. Dohner, Conroe, Tex., assignor to Penzoil Products Company, Houston, Tex.

Filed Aug. 9, 1988, Ser. No. 230,344
Int. Cl.[5] C23F *11/00*; C07D *307/60*
U.S. Cl. 422—14 6 Claims

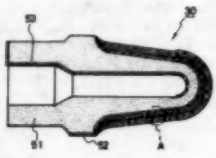
1. A method for inhibiting corrosion on a metal surface, comprising contacting the metal surface with an aqueous solution including a corrosion inhibitor comprising a hydrocarbyl polycarboxylate compound formed by the reaction of water and a neutralizing agent with a hydrocarbyl poly(succinic anhydride) of the formula R(succinic anhydride)$_x$, wherein R is a hydrocarbyl group derived from a crude or refined hydrocarbon wax having a melting point less than 150° F and x is an integer of from 3 to 8.

4,957,705

OXYGEN GAS CONCENTRATION-DETECTING APPARATUS

Akira Uchikawa, Isesaki, Japan, assignor to Japan Electronic Control Systems Co., Ltd., Gunma, Japan

Filed Nov. 6, 1987, Ser. No. 117,516
Claims priority, application Japan, Nov. 10, 1986, 61-171348[U]; May 25, 1987, 62-125752
Int. Cl.[5] G01N *27/16*
U.S. Cl. 422—94 14 Claims



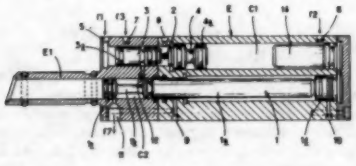
1. An oxygen concentration-detecting apparatus comprising a ceramic substrate for generating an electromotive force between a first surface contacted with a reference gas and a second surface contacted with a gas to be detected according to the ratio of the concentration of oxygen gas O_2 between said two gases, a pair of electrode members formed at parts of said first and second surfaces, respectively, of said ceramic substrate, to detect said electromotive force, a first oxidation catalyst layer for promoting mainly oxidation reaction of unburnt components, which is arranged to cover said second surface of said ceramic substrate and an outer surface of the electrode member on the second surface, a laminate comprising a protecting layer of a metal oxide covering the outer surface of said ceramic substrate and a reduction catalyst layer for promoting mainly reduction reaction of nitrogen oxides NOx, and a second oxidation catalyst layer for promoting mainly oxidation reaction of hydrogen gas H_2, which is arranged to cover an outer surface of said laminate.

4,957,706

DEVICE FOR PRESERVING STERILITY DURING SAMPLING FROM CULTURE MEDIUM CONTAINERS

Jean-Louis Romette, Orrouy, and Joël G. Fourreau, Compiegne, both of France, assignors to Centre National de la Recherche Scientifique, Paris, France

Filed May 21, 1987, Ser. No. 52,409
Claims priority, application France, May 22, 1986, 86 07329
Int. Cl.[5] G01N *1/10*
U.S. Cl. 422—100 15 Claims



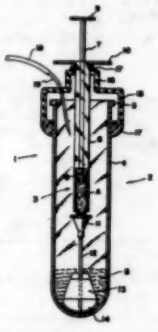
1. A device for preserving sterility during the taking of a sample for analysis from culture medium containers, said device comprising a holder containing a first, sampling chamber which encloses a first sliding piston fitted at one end with means for obtaining a sample for analysis, and a second dilution chamber linked to the first chamber by a duct, said second chamber being divided into two parts by a bearing means against which abut at least second and third pistons which may slide respectively on opposite sides of the bearing means, said second chamber including at least one inlet for dilution solvent.

4,957,707

THERMAL HAZARD EVALUATION

Thomas C. Hofelich, Midland, and Michael S. LaBean, Auburn, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 31, 1988, Ser. No. 238,889
Int. Cl.[5] B01L *3/00*
U.S. Cl. 422—102 11 Claims



1. A mixing cell adapted for use in testing the reaction resulting from the mixing of different substances, said cell comprising a first container open at one end and closed at its other end for accommodating a sample of one substance; a second container for accommodating a sample of another substance, said second container occupying a position in which at least a portion thereof is accommodated within said first container; flexible and resilient means rockably mounting said second container in said position and forming a seal for the open end of said first container; operating means in communication with said second container and accessible from outside both of said

containers for discharging a substance from said second container onto a substance in said first container; and agitating means carried by said second container adjacent said other end of said first container and engageable with a substance in said first container for agitating such substance in response to rocking movement of said second container relative to said first container.

4,957,708

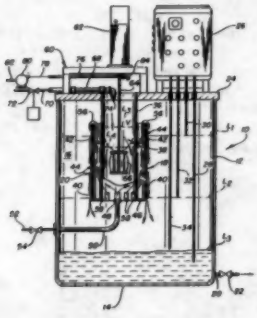
PROCESS AND APPARATUS FOR FORMING POLYMERIC SOLUTIONS

James P. Dutton, Vienna, N.J., and Ronald Beech, Zanesville, Ohio, assignors to Ashland Oil, Inc., Russell, Ky.

Continuation of Ser. No. 103,968, Oct. 5, 1987. This application Oct. 26, 1989, Ser. No. 427,459

Int. Cl.[5] G05D *9/00*

U.S. Cl. 422—106 **5 Claims**



1. An apparatus for forming a polymeric solution including a vessel defining a storage chamber therein and a mixing assembly, said mixing assembly comprising:

(a) a cylindrically-shaped inner wall member extending downwardly into said vessel, a bottom portion of said inner wall member having slots defining orifices therein;

(b) a bottom member mounted to a lower portion of said inner wall member and defining a mixing chamber therein;

(c) a cylindrically-shaped outer wall member co-axially disposed about said inner wall member and mounted to said bottom member and defining a solution chamber, said outer wall member extending upwardly from said bottom member defining weir means;

(d) a source containing polymer, conduit means for introducing a polymer and conduit means for introducing solvent into said mixing chamber; and

(e) agitator means including an agitator member disposed in said mixing chamber at a point intermediate said bottom member and said weir means of said outer wall member for forming a vortex of said polymeric solution into which said polymer and said solvent are introduced for admixing and for causing a resulting polymeric solution to pass through said orifices in said inner wall member, through said solution chamber and overflow said weir means of said outer wall member into said storage chamber, said agitator means forming said vortex for avoiding formation of fish eyes of said polymer.

4,957,709

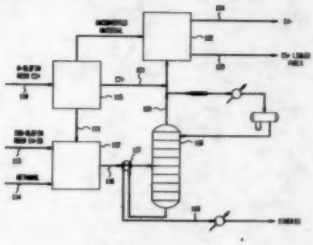
REACTOR SYSTEM FOR OLEFIN CONVERSION AND ETHERIFICATION

Mohsen N. Harandi, Lawrenceville, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 189,450, May 2, 1988, Pat. No. 4,886,925. This application Oct. 11, 1989, Ser. No. 419,927

Int. Cl.[5] B01J *14/00, 8/00*

U.S. Cl. 422—134 **4 Claims**



1. A reactor system for producing liquid fuel mixtures from olefin-containing feedstock and lower alcohols by multistage etherification, olefin interconversion and oligomerization reactions comprising:

first reactor means for contacting an olefinic hydrocarbon feedstock rich in C_2+ n-alkenes with acidic, medium pore metallosilicate catalyst in an olefin interconversion zone under mild olefin interconversion conditions to produce a reactor first effluent comprising C_4–C_6 alkenes rich in isoalkenes, C_7+ olefinic gasoline boiling range hydrocarbons and unconverted hydrocarbons;

first separation means for separating the first reactor effluent to provide a first effluent stream comprising C_4–C_6 alkenes rich in isoalkenes, a second effluent stream comprising C_7+ olefinic gasoline boiling range hydrocarbons and a third effluent stream comprising unconverted hydrocarbons;

second reactor, receivably connected to said first separation means, comprising means for reacting said first effluent stream with lower aliphatic alcohol in the presence of an acid etherification catalyst under reaction conditions effective to produce a mixture of tertiary-alkyl ethers;

second separation means for recovering a liquid product stream rich in tertiary-alkyl ethers and recovering a light hydrocarbon fraction containing unreacted alkenes from the reaction effluent of the first reactor means along with unreacted alcohol;

third reactor, receivably connected to said first and second separation means, comprising means for contacting the recovered light hydrocarbon and alcohol fraction from the second separation means concurrently with the second and third effluent streams from the first separation means with an acid and oxygenate conversion catalyst to convert at least a portion of said unreacted alkenes and alcohol to heavier liquid hydrocarbon product, including $C_{10}+$ distillate range hydrocarbons, aromatics and/or C_5–C_9 gasoline boiling range hydrocarbons.

4,957,710

CATALYTIC COMBUSTION TYPE EXHAUST GAS PROCESSING DEVICE AND DRYING FURNACE FOR USE IN COATING UTILIZING THE SAME

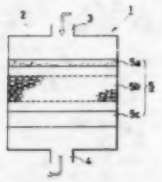
Teizi Nagai; Yasuo Tokushima; Sadao Kubota, all of Toyota; Kenichirou Suzuki, Aichi; Yoshiyasu Fujitani, Nagoya; Taisuke Yoshimoto, Nagoya; Hideaki Muraki, Nagoya, and Hideo Tachi, Aichi, all of Japan, assignors to Toyota Motor Corporation, Toyota; Kabushiki Kaisha Toyota Chou Kenkyusho, Aichi and Trinity Industrial Corp., Tokyo, all of, Japan

Continuation of Ser. No. 817,722, Jan. 10, 1986, abandoned. This application Mar. 25, 1988, Ser. No. 175,671

Claims priority, application Japan, Jan. 11, 1985, 60-1503; Jan. 11, 1985, 60-1504; Jan. 11, 1985, 60-1505

Int. Cl.[5] B01J *8/04, 23/00, 23/42, 23/44*

U.S. Cl. 422—171 **8 Claims**



1. A catalytic combustion-type processing device for exhaust gas discharged from a furnace for heating and drying a coating on an object and which exhaust gas contains volatile noxious/smelly components, said device comprising:

a catalytic reactor housing comprising wall means defining a chamber having an inlet and an outlet for a gas stream following in a direction along a path;

a first catalyst layer disposed in said chamber for dehydrogenating into aldehydes noxious/smelly components contained in a gas stream, said first catalyst layer comprising, in sequence along said path, a first sub-layer and a second sub-layer, each said sub-layer comprising at least one platinum group metal selected rom the group consisting of platinum, palladium, and mixtures thereof, said at least one platinum group metal being carried on a support; said support, in said first sub-layer being made of heat-resistant fibers; and

a second catalyst layer disposed in said chamber downstream of said second sub-layer of said first catalyst layer, said second catalyst layer comprising a copper-cerium compound carried on a support, for oxidatively decomposing said aldehydes and thereby effectively decomposing noxious/smelly components.

4,957,711

SINGLE CRYSTAL GROWING APPARATUS

Suk K. Min; Seung C. Park, and Chul W. Han, all of Seoul, Rep. of Korea, assignors to Korea Advanced Institute of Science and Technology, Seoul, Rep. of Korea

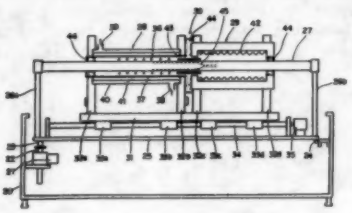
Filed Apr. 25, 1989, Ser. No. 344,293

Claims priority, application Rep. of Korea, Jul. 5, 1988, 8305[U]

Int. Cl.[5] C30B *11/00, 29/40, 35/00*

U.S. Cl. 422—245 **12 Claims**

1. A single crystal growing apparatus, which comprises a growing furnace including a high temperature part electric furnace and a low temperature part electric furnace, said growing furnace being at an outer peripheral surface of a quartz tube which supports a quartz reaction tube, the growing furnace being elongated and movable in the direction of elongation, said quartz tube being supported so as to be tiltable in a plane perpendicular to the direction of elongation, said high temperature part electric furnace having a heater wire disposed outside of the quartz tube, a cylindrical protecting quartz tube disposed outside of the heater wire, and a cylindrical double quartz tube and disposed at the outside of the protecting quartz tube which is provided with an inlet and an outlet through an outer wall of said cylindrical double quartz tube, and a gold film deposited at an inner wall of said cylindrical double quartz



tube, said protecting quartz tube blocking direct heating of the gold film from the heater wire, said cylindrical double quartz tube having an interior between said inlet and said outlet through which cooling water or gas may circulate.

4,957,712

APPARATUS FOR MANUFACTURING SINGLE SILICON CRYSTAL

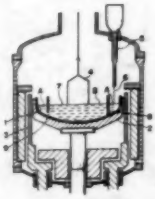
Yoshinobu Shima; Masanori Ohmura; Akira Ohtani, and Kenji Araki, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Filed Dec. 27, 1989, Ser. No. 457,322

Claims priority, application Japan, May 30, 1989, 1-136448

Int. Cl.[5] C30B *35/00*

U.S. Cl. 422—249 **9 Claims**



1. An apparatus for manufacturing a single silicon crystal comprising:

a quartz crucible accomodated into a graphite crucible, molten silicon being in said quartz crucible;

a partition member partitioning molten silicon material in said quartz crucible into a single silicon growing portion on the inner side and a material melting portion on the outer side, said material melting portion being replenished with raw materials and a single silicon crystal being pulled from said single silicon crystal growing portion;

a heater for maintaining said molten silicon material in the single silicon growing portion at a temperature appropriate for growing the single silicon crystal and for supplying heat for melting said raw materials fed into said material melting portion, said heater being arranged to surround said graphite crucible;

small holes made in said partition member, said molten silicon material moving from said material melting portion to said single silicon growing portion through said small holes; and

opaque quartz glass, which said partition member is made of.

4,957,713
APPARATUS FOR GROWING SHAPED SINGLE CRYSTALS

Dmitry Y. Kravetsky, ulitsa Bibliotechnaya, 13, kv. 91; Lev M. Zatulovsky, Orlikov pereulok, 8, kv. 55; Leonid P. Egorov, ulitsa Profsojuznaya, 75, korous 1, kv. 92; Boris B. Pelts, ulitsa Lesnaya, 63/43, kv. 157; Leonid S. Okun, ulitsa Udaltsova, 4, kv. 306; Efim A. Freiman, ulitsa 2-aya Vladimirovskaya, 15, korpus 1, kv. 53; Viktor V. Averyanov, ulitsa Energeticheskaya, 10, korpus 2, kv. 95, and Alexandr L. Alishoev, Kronshtadtsky bulvar, 13, korpus 2, kv. 168, all of Moscow, U.S.S.R.

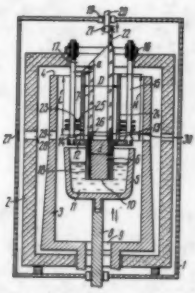
PCT No. PCT/SU87/00118, § 371 Date Jul. 20, 1988, § 102(e) Date Jul. 20, 1988, PCT Pub. No. WO88/03968, PCT Pub. Date Jun. 2, 1988

PCT Filed Oct. 23, 1987, Ser. No. 241,978

Claims priority, application U.S.S.R., Nov. 26, 1986, 4149059

Int. Cl.[5] C30B *15/34*

U.S. Cl. 422—249 **2 Claims**



1. An apparatus for growing shaped single crystals of high-melting transparent metal compounds, comprising a sealed chamber housing, a heat insulating unit with a heater in the form of a sleeve accommodating a crucible mounted for axial reciprocations in the sleeve, a shape imparting member in the form of a cylinder having through capillary orifices for supplying a melt from the crucible into a zone of crystallization of a single crystal located above an upper end of the shape-imparting member which is configured to have a cross-sectional shape of the single crystal being grown and which is located below an upper extremity of the heater, and horizontally extending planar thermal shields having coaxial openings for the single crystals being grown to pass therethrough, and an auxiliary thermal shield in the form of a hollow cylinder comprised of a material having a high melting point, said thermal shield extending in the openings of the planar thermal shields coaxially therewith, said thermal shield being situated in close proximity with a crystallization front of said crystal.

4,957,714
SOLVENT EXTRACTION PROCESS

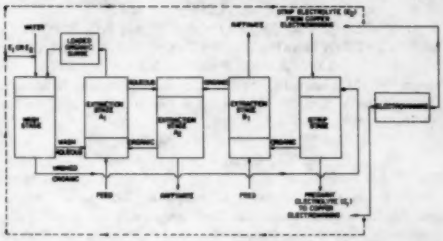
Stephen M. Olafson; Roy G. Lewis, and Gary A. Kordosky, all of Tucson, Ariz., assignors to Henkel Corporation, Ambler, Pa.

Filed Apr. 28, 1988, Ser. No. 187,111

Int. Cl.[5] C01G *3/00*

U.S. Cl. 423—24 **17 Claims**

1. In a solvent extraction process for recovery of copper from an aqueous feedstock containing copper and iron values wherein the feedstock is contacted with an organic phase comprising a reagent composition including an hydroxy aryl oxime extractant and in which a copper loaded organic phase is provided by extraction of said copper values from said aqueous feedstock and wherein contact between the feedstock and the organic phase is accomplished by means of at least one mixer-settler extraction stage and at least one strip stage to provide a pregnant copper electrolyte from which the copper is electrowon to provide cathode copper and a stripped electrolyte the improvement comprising washing said copper



loaded organic phase prior to stripping said copper values therefrom with an aqueous scrub solution containing at least a portion of electrolyte thereby providing an increased copper to iron ratio by weight in said copper loaded organic phase.

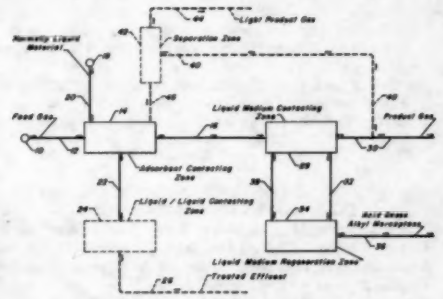
4,957,715
GAS TREATMENT PROCESS

Bhadra S. Grover, Pound Ridge, N.Y., and Moez M. Nagji, Stamford, Conn., assignors to UOP, Des Plaines, Ill.

Filed Apr. 15, 1988, Ser. No. 181,780

Int. Cl.[5] C01B *17/16, 31/20*; B01D *53/02, 11/00*

U.S. Cl. 423—228 **30 Claims**



1. A process for the removal of carbon dioxide, hydrogen sulfide and alkyl mercaptans from a feed gas containing hydrocarbons having from 1 to about 8 carbon atoms per molecule comprising:

(a) contacting the feed gas with an adsorbent capable of removing hydrogen sulfide and alkyl mercaptans from the feed gas at effective conditions to produce a treated gas having reduced concentrations of hydrogen sulfide and alkyl mercaptans relative to the feed gas;

(b) contacting the treated gas with a liquid medium capable of removing carbon dioxide, hydrogen sulfide and alkyl mercaptans from the treated gas at effective conditions to produce a product gas having reduced concentrations of carbon dioxide, hydrogen sulfide and alkyl mercaptans relative to the treated gas and an acid gas-rich effluent;

(c) separating the product gas into a low boiling fraction and a high boiling fraction, said high boiling fraction comprising at least 50% by weight of hydrocarbons having at least 4 carbon atoms per molecule;

(d) contacting a spent adsorbent laden with hydrogen sulfide and alkyl mercaptans with a normally liquid regeneration medium comprising at least a portion of said high boiling fraction at effective desorption conditions to maintain said regeneration medium substantially in the vapor phase and produce a regenerated adsorbent and a regeneration effluent having increased concentrations of hydrogen sulfide and alkyl mercaptans; and

(e) utilizing the regenerated adsorbent as at least a portion of the adsorbent in step (a).

4,957,716

METHOD FOR REMOVAL OF SO_2 and NO_x FROM COMBUSTION GASES BY METAL CHELATION AND THERMAL REDUCTION

Joseph E. Cichanowicz, Sunnyvale, and Patrick Maroney, Orinda, both of Calif., assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Nov. 21, 1988, Ser. No. 274,514
Int. Cl.[5] C01B *17/00, 21/00*
U.S. Cl. 423—235 11 Claims

1. A process for removal of sulfur dioxide and nitrogen oxides from a gaseous mixture comprising the steps of

(a) contacting in a first reaction zone a gas mixture containing sulfur dioxide and nitrogen oxides with a first aqueous mixture at a pH in the range of about 4.5 to 7, said first mixture comprising a first sorbent suitable for removing of sulfur dioxide and nitrogen oxides from said gas mixture, in the presence of a metal chelating agent to convert said nitrogen oxides and sulfur dioxide to hydroxylaminedisulfonate and withdrawing said first aqueous mixture from said first reaction zone;

(b) mixing at least a portion of said hydroxylaminedisulfonate in a second reaction zone in an aqueous environment of a pH of 4.2 or less, thereby converting said hydroxylaminedisulfonate to ammonium ions and sulfate ions in a second aqueous solution;

(c) contacting said second aqueous solution with a second ammonium ion-absorbing sorbent suitable for removing ammonium ions from said second aqueous solution and separating said second sorbent from said second aqueous solution;

(d) eluting said second sorbent and exposing the eluted ammonium ions or ammonia to nitrogen oxides at a temperature sufficient to form nitrogen and water therefrom.

4,957,717

METHOD OF DISPOSAL OF ORGANIC CHLORINE COMPOUNDS BY COMBUSTION

Seiichiro Imamura, Kyoto; Sadao Terui; Kunio Sano, all of Hyogo; Kazuyoshi Nishikawa, Himeji, and Akira Inoue, Hirakata, both of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan

Filed Jan. 4, 1990, Ser. No. 461,120
Claims priority, application Japan, Jan. 9, 1989, 1-1161; Nov. 8, 1989, 1-292067
Int. Cl.[5] C01B *7/01, 3/22;* B01D *53/36*
U.S. Cl. 423—240 3 Claims

1. A method of disposing of organic chlorine compounds by combustion, the method comprising burning organic chlorine compounds in a gaseous atmosphere containing oxygen, the organic chlorine compounds being placed in contact with a catalyst of composite oxides selected from titanium-silicon composite oxides, titanium-zirconium composite oxides, and titanium-silicon-zirconium composite oxides, whereby the chlorine content is converted into hydrogen chloride (HCl).

4,957,718

PROCESS FOR REDUCING EMISSIONS OF SULFUR OXIDES AND COMPOSITION USEFUL IN SAME

Jin S. Yoo, Flossmoor, Ill.; John A. Karch, Marriottsville; Alakananda A. Bhattacharyya, Columbia, both of Md., and Cecelia A. Radlowski, Riverside, Ill., assignors to UOP, Des Plaines, Ill.

Filed Nov. 24, 1987, Ser. No. 124,618
Int. Cl.[5] B01D *53/04*
U.S. Cl. 423—244 15 Claims

1. A process for the removal of sulfur oxides from a gas which comprises (a) contacting said sulfur oxide-containing gas with at least one metal, oxygen-containing component at conditions effective to associate at least a portion of said sulfur oxides with said component to reduce the amount of sulfur oxides in said gas; and (b) contacting said component containing associated sulfur oxides at conditions effective to reduce the amount of sulfur associated with said component, said component having an empirical formula selected from the following: (1) $A_{1-x}M_xB_{1-y}M'_yO_{3-z}$; (2) $A_2B_2O_{7-w}$; and (3) $A_{2-u}M_uB_{2-v}M'_vO_{7-w}$ wherein A is selected from the group consisting of the lanthanide series metals, alkaline earth metals, sodium, potassium, cesium and mixtures thereof; M-is different from A, B and M' and is selected from the group consisting of alkaline earth metals, Group VIII metals, manganese, lead, zinc, thorium, yttrium cerium and mixtures thereof; B and M' are different from each other and are independently selected from the group consisting of Group VIII metals, magnesium, titanium, manganese, copper, aluminum, niobium, tantalum, chromium, gallium, zirconium, vanadium, molybdenum, antimony, bismuth, tin, tungsten and mixtures thereof; x and y are independently in the range of 0 to 1 so that the total number of positive charges from A, M, B and M' in empirical formula (1) is within the range of about 5 to about 7, u and v are independently in the range of 0 to 2 so that the total number of positive charges for A, M, B and M' in empirical formula (3) is within the range of about 12 to about 16, z is in the range of about −0.5 to about 0.5 and w is in the range of about −1 to about 1, provided that not all of x, y and z are zero in empirical formula (1) and not all of u, v and w are zero in empirical formula (3), and further provided that when B is niobium, A is selected from sodium, potassium, cesium and mixtures thereof.

4,957,719

PROCESS FOR PREPARATION OF SYNTHETIC MAZZITE

Toshiyuki Taga, and Senshi Kasahara, both of Shinnanyo, Japan, assignors to Tosoh Corporation, Shinnanyo, Japan

Continuation of Ser. No. 138,053, Dec. 28, 1987, abandoned.
This application Mar. 31, 1989, Ser. No. 332,422
Claims priority, application Japan, Dec. 26, 1986, 61-308889
Int. Cl.[5] C01B *33/28*
U.S. Cl. 423—328 3 Claims

1. A process for the preparation of synthetic mazzite which comprises the steps of:

a. preparing a mixture of an aqueous solution of an alkali metal silicate, an aqueous solution of an alkali metal aluminate, an aqueous solution of an alkali metal hydroxide and a tetramethylammonium compound;

b. heating and aging said mixture at a temperature of 25 to 50° C.;

c. stirring said mixture for a period of time such that a transparent liquid phase substance is formed, said transparent liquid phase substance comprising the following oxide molar ratios:

SiO_2/Al_2O_3 =	8 to 25,
M_2O/Al_2O_3 =	7 to 30,
H_2O/M_2O =	10 to 14, and
TMA/SiO_2 =	0.05 to 0.25,

wherein M is an alkali metal cation and TMA is a tetramethylammonium ion;

d. adding said transparent liquid phase substance to a starting mixture containing a silica source, an alumina source, and an alkali source to form a mixture comprising the following oxide molar ratios:

TMA/SiO_2 =	0.02 to 0.04,
SiO_2/Al_2O_3 =	5 to 30,
M_2O/Al_2O_3 =	0.5 to 10,
H_2O/SiO_2 =	10 to 40, and

e. crystallizing said mixture in d. at a temperature of from 90 to 140° C.

4,957,720

PROCESS FOR THE GENERATION OF MECHANICAL ENERGY IN THE AMMONIA OXIDATION STEP OF A NITRIC ACID PRODUCTION PROCESS

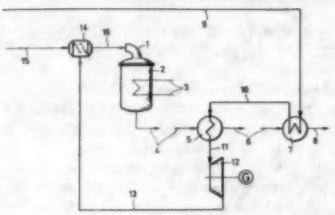
Karl W. Wiegand; Michael Thiemann, and Erich Scheibler, all of Dortmund, Fed. Rep. of Germany, assignors to UHDE GmbH, Dortmund, Fed. Rep. of Germany

Filed Jan. 31, 1990, Ser. No. 472,754

Claims priority, application Fed. Rep. of Germany, Feb. 7, 1989, 3903570

Int. Cl.[5] C01B *21/26, 21/40*

U.S. Cl. 423—392 **14 Claims**



1. A process for gernerating mechanical energy in the ammonia oxidation step of a nitric acid production process, wherein the combustion of ammonia is carried out to form NO_x, comprising evaporating and superheating liquid ammonia upstream of the oxidation step at a pressure which is a multiple of the combustion pressure by means of process heat of the NO_x gases formed during the combustion of ammonia and then expanding the superheated ammonia in a turbine to generate mechanical energy.

4,957,721

PROCESS FOR REGENERATION OF ACTIVATED CARBON

Jack J. Lonsinger, and Deborah A. Lonsinger, both of 508 Clayview Dr., Liberty, Mo. 64068

Filed Jun. 28, 1988, Ser. No. 212,610

Int. Cl.[5] C01B *31/02*

U.S. Cl. 423—461 **13 Claims**

1. A process for activating carbonaceous material having volatile and nonvolatile contaminants, said process comprising:

(A) providing an activation zone wherein the reaction $C+H_2O \rightarrow CO+H_2$ occurs;

(B) providing immediately adjacent said activation zone a drying zone to which gases from said activation zone are directed to remove water from said material;

(C) providing a gas incineration zone removed from the downstream of both said regeneration and drying zones;

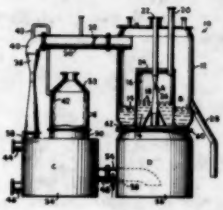
(D) feeding a carbonaceous material to be activated to said drying zone;

(E) drying said material to remove said volatiles and substantially all of said water;

(F) moving said dried material directly to said activation zone without further processing;

(G) raising the temperature in said activation zone while supplying sufficient water to effect said reaction and to volatilize and oxidize at least some of the contaminants;

(H) directing the off gases and water vapor from steps (E) and (G) to a mixing zone where they are mixed with air;



(I) incinerating the output from step (H) to effect oxidation of said volatilized contaminants;

(J) directing said incinerated output from step (I) to a conditioning zone;

(K) conditioning the output from step (I) by adding to said step (I) output fuel which when burned acts as a reductant to consume any residual oxygen present; and

(L) returning the conditioned gas from step (I) to said activation zone.

4,957,722

PRODUCTION OF PARTIALLY CALCINED CARBONACEOUS REDUCTANT USING STEAM

Raouf O. Loutfy, Tucson, Ariz.; Kirk R. Weisbrod, Celina, Tex., and James C. Withers, Tucson, Ariz., assignors to Aluminum Company of America, Pittsburgh, Pa.

Division of Ser. No. 684,935, Dec. 21, 1984, Pat. No. 4,836,998. This application Apr. 3, 1989, Ser. No. 332,029

Int. Cl.[5] C01F *7/60, 5/32;* C01B *31/02, 9/02*

U.S. Cl. 423—496 **30 Claims**

1. A method of producing chlorides by the chlorination of a material selected from the group consisting of aluminous materials and metal oxides other than aluminium oxide in the presence of a reductant comprising:

(a) calcining a hydrogen or hydrocarbon-containing carbonaceous material with added steam at a temperature of from about 650° C. to about 1150° C. for a time period sufficient to oxidize substantially all precursors of chlorinated hydrocarbons and to form a reductant; and

(b) chlorinating a material selected from the group consisting of aluminous materials and metal oxides other than aluminium oxide in the presence of said reductant formed in step (a).

4,957,723

CONDUCTIVE COATING COMPOSITION COMPRISING GRAPHITE INTERCALATION COMPOUND AND PROCESS FOR PREPARING THE INTERCALATION COMPOUND

Hiroshi Nishino, Yokohama, Japan, assignor to Arata Yamasaki and SK Kohki Co., Ltd., both of Tokyo, Japan

Filed Oct. 5, 1988, Ser. No. 253,519

Claims priority, application Japan, Oct. 6, 1987, 62-250642; Dec. 29, 1987, 62-333282; Feb. 16, 1988, 63-31759

Int. Cl.[5] C01B *31/02;* H01B *1/06;* C09C *1/56*

U.S. Cl. 423—449 **2 Claims**

1. A process for preparing a graphite intercalation compound comprising reacting together, under substantially molten conditions, including a temperature of about 380° to 450°

C., a dried metal chloride selected from the group consisting of copper chloride, cadmium chloride, cobalt chloride, nickel chloride and chromium chloride; a metal salt, capable of forming a molten salt by reaction with said metal chloride, selected from the group consisting of potassium chloride and sodium chloride; and graphite having a particle size of about 20 to 70 microns, in a chlorine gas atmosphere at about atmospheric pressure; wherein said metal chloride is present in an amount of at least 0.5 mole per mole of graphite, in excess of the proportion of metal chloride which would be present at the eutectic point of the molten metal salt, but not sufficient to cause a solid phase of said metal chloride in said molten reaction system.

4,957,724

PROCESS AND REACTOR FOR CATALYTIC REACTION OF H_2S AND SO_2 TO SULFUR

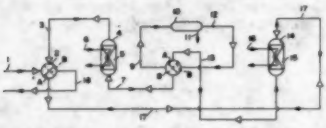
Freimut Marold, Neubiberg, and Michael Heisel, Pullach, both of Fed. Rep. of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Filed Mar. 21, 1988, Ser. No. 171,348

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1987, 3709031; Mar. 19, 1987, 3709048

Int. Cl.[5] C01B *17/06;* G05D *7/00*

U.S. Cl. 423—574 R 22 Claims



3. In a process comprising catalytically reacting in a gas stream gaseous H_2S with gaseous SO_2 to elementary sulfur, wherein during one cycle a first fixed catalyst bed for conducting the reaction and adsorbing sulfur is operated below the sulfur dewpoint and another fixed catalyst bed is regenerated to remove the deposited sulfur in the vapor phase, the improvement which comprises using a system provided with only two fixed catalyst beds arranged in reactors with internal indirect heating and cooling means, which are cyclically switched from the reaction to the regeneration mode and vice versa, conducting the reaction between H_2S and SO_2 in at least a part of a catalyst bed below the sulfur solids condensation point, thereby adsorbing the formed sulfur in said part of the catalyst bed.

4,957,725

VANADIUM DIOXIDE FORMED BY THE SOL-GEL PROCESS

Richard S. Potember, Catonsville; Kenneth R. Speck, Baltimore, and Henry S. Hu, Derwood, all of Md., assignors to The Johns Hopkins University, Baltimore, Md.

Filed Jul. 5, 1988, Ser. No. 215,107

Int. Cl.[5] C01G *31/00*

U.S. Cl. 423—592 26 Claims

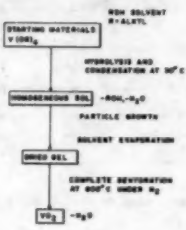
1. A process for the deposition of a crystalline vanadium dioxide thin film comprising:

providing a solution comprising a vanadium tetraalkoxide and solvent;

allowing hydrolysis and condensation reactions to progressively form a homogenous sol from the solution,

applying a coating of the sol to the substrate;

allowing a gel to form from the sol on the substrate by evaporating the solvent; dehydrating the gel by heat treat-



ment under an inert atmosphere to form the crystalline vanadium dioxide film.

4,957,726

PREPARATION OF AMINE ALANES AND LITHIUM ALUMINUM TETRAHYDRIDE

Everett M. Marlett; Arcelio J. Malcolm, and Won S. Park, all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Apr. 12, 1989, Ser. No. 337,086

Int. Cl.[5] C01B *6/24*

U.S. Cl. 423—644 25 Claims

1. A process which comprises, in combination:

(a) reacting lithium aluminum tetrahydride and a tertiary amine such that an amine alane and lithium aluminum hexahydride are produced, and

(b) reacting lithium aluminum hexahydride from the reaction of (a) with aluminum and hydrogen under pressure such that lithium aluminum tetrahydride is produced.

4,957,727

PROCESS FOR THE PRODUCTION OF MAGNESIUM HYDRIDES

Borislav Bogdanovic, Mulheim/Ruhr, Fed. Rep. of Germany, assignor to Studiengesellschaft Kohle mbH, Mulheim/Ruhr, Fed. Rep. of Germany

Continuation of Ser. No. 771,457, Aug. 30, 1985, abandoned, which is a continuation of Ser. No. 626,819, Jul. 2, 1984, Pat. No. 4,554,153, which is a continuation-in-part of Ser. No. 433,078, Oct. 6, 1982, abandoned, which is a continuation-in-part of Ser. No. 187,907, Sep. 17, 1980, abandoned, which is a continuation of Ser. No. 8,739, Feb. 2, 1979, abandoned. This application Apr. 27, 1988, Ser. No. 186,525

Claims priority, application Fed. Rep. of Germany, Feb. 2, 1978, 2804445

The portion of the term of this patent subsequent to Jan. 17, 2006, has been disclaimed.

Int. Cl.[5] C01B *6/04*

U.S. Cl. 423—647 5 Claims

1. Magnesium hydride identical with that produced by reacting magnesium with hydrogen in a solvent in the presence of anthracene and a halide of a transition metal of the IVth to VIIIth sub-group of the periodic system, the hydride having a high surface area of at least about 129 m^2/g and being capable of substantially complete reversible desorption of hydrogen at 300° to 315° C. and 1 mm Hg and resorption of hydrogen even at 20° C. and 1 bar.

4,957,728

KIT FOR PREPARING TC (III)-99M MYOCARDIAL IMAGING AGENTS THAT ARE EFFECTIVE IN HUMANS

Edward A. Deutsch, and Karen F. Libson, both of Cincinnati, Ohio, assignors to University of Cincinnati, Cincinnati, Ohio

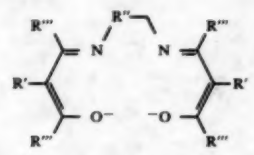
Division of Ser. No. 354,491, May 19, 1989, Pat. No. 4,917,879. This application Jan. 11, 1990, Ser. No. 463,403

Int. Cl.[5] A61K *49/02*; B65D *69/00*

U.S. Cl. 424—1.1 4 Claims

1. A kit for preparing a technetium 99m myocardial imaging agent, said kit comprising:

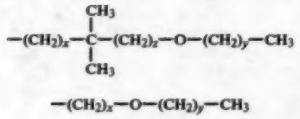
a first and second vial, said first vial containing a lyophilized pyrogen free sterile mixture of an effective reducing agent and a ligand having the following general formula:



wherein R′ and R‴ represent H, hydroxyl, (C_1–C_5 alkyl, C_1–C_5 alkyl substituted by hydroxyl, ether, amide, ketone, aldehyde or nitrile groups and R″ represents C_1–C_4 alkylene, C_1–C_4 alkylene which may be substituted with hydroxyl, ether, amide, ketone, aldehyde or nitrile groups and

wherein said second vial contains a lyophilized, pyrogen free, sterile protected salt of a phosphine ligand, said phosphine ligand having the following general formula:

wherein R_4 and R_5 represent the same or different group



wherein X=1–4, Y=0–4 and Z=0–4 and wherein R_3 represents the same ligands represented by R_4 or R_5 or may represent: —OCH_3, —C_1—C_5 alkyl.

4,957,729

POLYIODINATED TRIGLYCERIDE ANALOGS AS RADIOLOGIC AGENTS

Raymond E. Counsell; Marc A. Longino; Jamey P. Weichert, and Susan P. Schweadner, all of Ann Arbor, Mich., assignors to The University of Michigan, Ann Arbor, Mich.

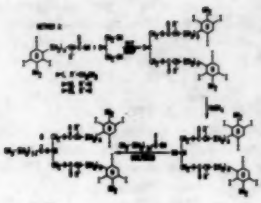
Division of Ser. No. 774,498, Sep. 10, 1985, Pat. No. 4,873,075. This application May 30, 1989, Ser. No. 358,865

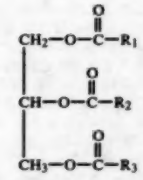
Int. Cl.[5] C11C *3/02*; A61K *49/04*

U.S. Cl. 424—5 8 Claims

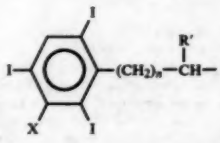
1. A composition comprising an effective radiologically contrast producing amount amount of a radiologic agent and a carrier fro said radiologic agent:

said radiologic agent comprising a polyiodinated triglyceride analog of the general formula:





wherein R_1, R_2, and R_3 are each selected from the gorup consisting of saturated and unsaturated aliphatic hydrocarbon chains found in naturally occurring fatty acids and 3-substituted-2,4,6-triiodophenyls of the general formula:



wherein X is selected from the group consisting of H, NH_2 and NHCOR″, R′ is selected from the group consisting of H and lower alkyls, R″ is a lower alkyl, n is an integer from 0–15 and wherein at least two of said R_1, R_2, and R_3 are said 3-substituted 2,4,6-triiodophenyls; and

said carrier comprising a lipid emulsion.

4,957,730

ANTIMYCOTIC NAIL VARNISH

Manfred Bohn; Walter Dittmar, both of Hofheim am Taunus; Heinz G. Peil, Bad Nauheim; Eberhard Futterer, Kelkheim, and Karl Kraemer, Langen, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

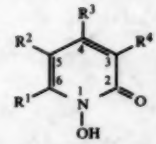
Filed Dec. 17, 1986, Ser. No. 942,699

Claims priority, application Fed. Rep. of Germany, Dec. 19, 1985, 3544983

Int. Cl.[5] A61K *7/043*

U.S. Cl. 424—61 21 Claims

1. A nail varnish comprising a water insoluble film-forming substance and an antimycotic compound which is a 1-hydroxy-2-pyridone of the formula (I)



(I)

in which R^1 is a hydrocarbon group which contains from 6 to

9 carbon atoms, but said hydrocarbon group being free from olefinic and acetylenic bonds, one of the groups R^2 and R^4 is hydrogen and the other is hydrogen, methyl or ethyl and R^3 is alkyl having up to two carbon atoms, said antimycotic ingredient being present in free form or in the form of a salt, and in an amount effective against nail mycoses.

4,957,731

HAIR PROCESSING ADDITIVES

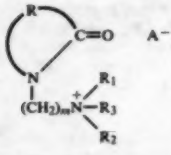
Michael W. Helioff, Westfield; Carmen D. Bires, Long Valley, and Robert B. Login, Oakland, all of N.J., assignors to GAF Chemicals Corporation, Wayne, N.Y.

Continuation-in-part of Ser. No. 188,522, Apr. 29, 1988, Pat. No. 4,885,158, Continuation-in-part of Ser. No. 91,149, Aug. 28, 1987, Pat. No. 4,837,013, which is a continuation-in-part of Ser. No. 922,923, Oct. 24, 1986, Pat. No. 4,732,990, Continuation-in-part of Ser. No. 91,010, Aug. 28, 1987, Pat. No. 4,883,655, which is a continuation-in-part of Ser. No. 922,923, Oct. 24, 1986, Pat. No. 4,732,990, Continuation-in-part of Ser. No. 91,008, Aug. 28, 1987, Pat. No. 4,830,850, which is a continuation-in-part of Ser. No. 922,923, Oct. 24, 1986, Pat. No. 4,732,990, Continuation-in-part of Ser. No. 67,195, Jun. 29, 1987, Pat. No. 4,834,970, which is a continuation-in-part of Ser. No. 922,923, Oct. 24, 1986, Pat. No. 4,732,990, Continuation-in-part of Ser. No. 60,285, Jun. 10, 1987, Pat. No. 4,871,535, which is a continuation-in-part of Ser. No. 922,923, Oct. 24, 1986, Pat. No. 4,732,990, Continuation-in-part of Ser. No. 60,284, Jun. 10, 1987, Pat. No. 4,834,767, which is a continuation-in-part of Ser. No. 922,923, Oct. 24, 1986, Pat. No. 4,732,990. This application Apr. 19, 1989, Ser. No. 340,194

Int. Cl.[5] A61K *7/075, 7/135, 7/13, 7/09*

U.S. Cl. 424—62 **14 Claims**

1. A hair treating composition containing an inert carrier, an active hair processing agent selected from the group consisting of hair bleaching agent, a hair coloring agent, a hair setting agent, a hair reducing agent employed to alter hair structure and an oxidizing agent employed to arrest the reducing action of a reducing agent used in the structural alteration of hair and an effective conditioning amount of an organic quaternized lactam having the formula



wherein m is an integer having a value of from 1 to 4; R is linear alkylene having from 3 to 8 carbon atoms and is optionally substituted with C_1 to C_4 alkyl; R_1, R_2 and R_3 are each independently selected from the group of alkyl, alkyleneoxyalkyl, alkyleneoxyalkenyl, alkoxy, hydroxyalkyl, aryl, aralkyl, alkaryl, alkyleneamidoalkyl, alkylenecarbamoylalkyl, aryleneamidoalkyl and arylenecarbamoylalkyl radicals, and R_2 and R_3, together with the quaternized nitrogen atom can form a 5 to 14 membered heterocyclic radical containing from 1 to 2 heteroatoms selected from the group of nitrogen, sulfur and oxygen, in which case R_1 can represent a double bond in the heterocyclic structure or can be any of the aforementioned groups for R_1, R_2 and R_3; said groups R_1, R_2 and R_3 each having up to 30 carbon atoms and at least one of R_1, R_2 and R_3 being a radical having from 8 to 30 carbon atoms when R_2 and R_3 are not part of a heterocyclic moiety; and A^- is an anion derived from an oxylated sulfur compound, having the formula:

$$R'SO_3^-$$

wherein R' is alkyl, alkoxy, phenyl, phenoxy, alkylenephenyl, alkylenephenoxy, phenylenealkyl or phenyleneoxyalkyl and wherein the alkyl moieties of said R' groups contain from 1 to 20 carbon atoms and said R' groups are optionally alkoxylated with from 1 to 20 units of ethyleneoxide and/or propylene oxide.

4,957,732

SHAVING COMPOSITION FOR THE SKIN BASED ON POLYORGANO-SILOXANES CONTAINING AN ACYLOXYALKYL GROUP AND PROCESS FOR USE

Jean F. Grollier, Paris, and Alain Caudet, Boulogne-Billancourt, both of France, assignors to L'Oreal, Paris, France

Filed Dec. 28, 1989, Ser. No. 458,236

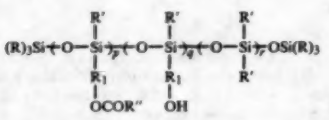
Claims priority, application France, Dec. 29, 1988, 8817433

Int. Cl.[5] A61K *7/15*

U.S. Cl. 424—73 **14 Claims**

1. Composition intended for shaving of the skin, characterized in that it contains, in a cosmetically acceptable medium including a foaming agent, a polyorganosiloxane containing an acyloxyalkyl group, selected

531 (i) linear compounds corresponding to the following average formula (I):



(I)

in which:

the radicals R, which may be identical or different, are selected from methyl, phenyl, OCOR" and hydroxyl radicals; only one of the radicals R per silicon atom can be OH;

the radicals R', which may be identical or different, are selected from methyl and phenyl radicals; at least 60 mol % of all the radicals R and R' is methyl;

R_1 represents a divalent linear or branched alkylene group of the hydrocarbon type containing from 2 to 18 carbon atoms;

R" is a C_8–C_{20} alkenyl or alkyl radical;

r is a number between 1 and 120 inclusive;

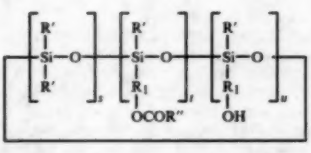
p is a number between 1 and 30; and

q is equal to 0 or is a number not exceeding 0.5 p, the sum p+q being between 1 and 30;

it being possible for the compounds of formula (I) optionally to contain

groups, present in proportions not exceeding 15% of the sum p+q+r; and

(ii) cyclic compounds represented by the following average formula (II):



(II)

in which:

R', R" and R_1 have the same meaning as in the formula (I);

s is a number between 0 and 20;

t is a number between 1 and 20; and

u is equal to 0 or is equal to a number not exceeding 0.5 t, the sum t+u being between 1 and 20;

the sum s+t+u being not less than 3.

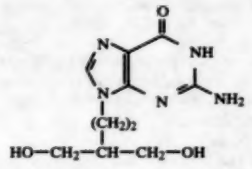
4,957,733

PHARMACEUTICAL PRODUCTS

Martin Cole, Betchworth; Malcolm R. Boyd, and David Sutton, both of Epsom, all of England, assignors to Beecham Group P.L.C., England

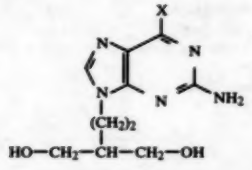
Filed Nov. 30, 1987, Ser. No. 126,406
Claims priority, application United Kingdom, Dec. 2, 1986, 8628826
Int. Cl.[5] A61K *37/66*
U.S. Cl. 424—85.4 7 Claims

1. A pharmaceutical composition for use in treating viral infections comprising an interferon and an antiviral effective amount of a compound of formula (A):



(A)

a pro-drug of the compound of formula (A) having the formula (B)



(B)

wherein X is hydrogen, or a pharmaceutically acceptable salt, a phosphate ester, or aryl derivative of either (A) or (B), and a pharmaceutically acceptable carrier.

4,957,734

TREATMENT OF CERTAIN SKIN MALIGNANCIES AND PRE-MALIGNANT SKIN LESIONS, HERPES ZOSTER AND PSORIASIS

Daniel G. Miller, Scarsdale, N.Y., assignor to Exovir, Inc., Great Neck, N.Y.

Continuation of Ser. No. 851,885, Apr. 11, 1986, abandoned, which is a continuation of Ser. No. 651,277, Sep. 14, 1984, abandoned, which is a continuation of Ser. No. 388,260, Jun. 14, 1982, abandoned. This application Jul. 6, 1987, Ser. No. 70,592
Int. Cl.[5] A61K *37/66*
U.S. Cl. 424—85.7 2 Claims

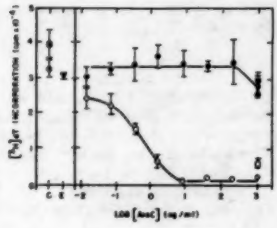
1. A method for the treatment of malignant and pre-malignant skin lesions and skin lesions associated with herpes zoster and psoriasis which comprises topically administering to the affected skin area an amount of a composition consisting essentially of affective amount of human leukocyte interferon and an effective antiviral amount of the non-ionic surfactant nonylphenoxy-polyethoxyethanol and a physiologically acceptable carrier.

4,957,735

TARGET-SENSITIVE IMMUNOLIPOSOMES-PREPARATION AND CHARACTERIZATION

Leaf Huang, Knoxville, Tenn., assignor to The University of Tennessee Research Corporation, Knoxville, Tenn.

Continuation-in-part of Ser. No. 816,817, Jan. 7, 1986, abandoned, which is a continuation-in-part of Ser. No. 619,844, Jun. 12, 1984, Pat. No. 4,708,933. This application Feb. 9, 1987, Ser. No. 12,321
The portion of the term of this patent subsequent to Nov. 24, 2004, has been disclaimed.
Int. Cl.[5] A61K *9/50, 39/42, 39/44*
U.S. Cl. 424—85.8 20 Claims



15. A method of delivering therapeutic agents to the surface of cells in need of such treatment comprising the steps of:

(a) forming target sensitive immunoliposomes from phosphatidylethanolamine and a stabilizing amount of fatty acid (C_{12} to C_{24}) derivatized antibody, said antibody having an affinity for the target cell surface;

(b) entrapping one or more therapeutic agents within the immunoliposomes of step (a); and

(c) administering the immunoliposomes prepared in step (b) to a patient in need of such treatment.

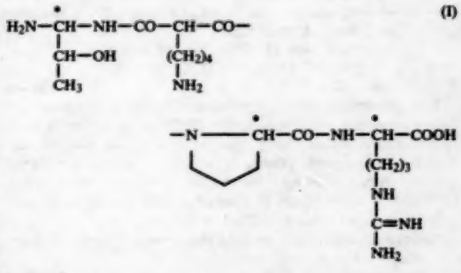
4,957,736

COMPOSITION FOR VACCINES

Luciano Nescioni, Poggibonsi; Piero Pileri, Monteriggioni; Samuele Peppoloni, Perugia, and Sergio Silvestri, Siena, all of Italy, assignors to Sclavo S.p.A., Siena, Italy

Filed May 26, 1989, Ser. No. 357,267
Claims priority, application Italy, Feb. 10, 1989, 19408 A/89
Int. Cl.[5] A61K *39/002, 39/02, 39/10, 39/12*
U.S. Cl. 424—88 5 Claims

1. A vaccine comprising one or more antigens of either natural or synthetic origins, together with an adjuvant amount of a compound of formula (I)



(I)

wherein the absolute configuration of each carbon atom marked with an asterisk is the L-configuration, and the absolute configuration of the carbon atom of the malonyl residue is either the L- or the D-configuration; or with a pharmaceutically acceptable base-addition or acid-addition salt thereof.

4,957,737

HTLV-III (LAV) ENVELOPE PEPTIDES

Edgar P. Heimer, Sparta, and Premkumar E. Reddy, Montclair, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation of Ser. No. 160,847, Feb. 1, 1988, abandoned, which is a continuation of Ser. No. 866,817, May 27, 1986, abandoned. This application Aug. 21, 1989, Ser. No. 396,195

Int. Cl.[5] A61K *39/12, 37/02;* C07K *7/10*

U.S. Cl. 424—88 4 Claims

1. A peptide of the formula

W-X-Ala-Arg-Ile-Leu-Ala-Val-Glu-Arg-Tyr-Leu-Lys-Asp-Gln-Gln-Leu-Leu-Gly-Ile-Trp-Gly-Cys-Ser-Gly-Lys-Leu-Ile-Cys-Thr-Thr-Ala-Val-Y-Z

where W is H-, Cys- or Tyr, X is a bond, Y is a bond, and Z is —OH, —NH_2 or —Cys-NH_2.

4,957,738

PROTEIN COPOLYMER MALARIA VACCINE

Manuel E. Patarroyo, P.O. Boxa 4402, Bogota, Colombia

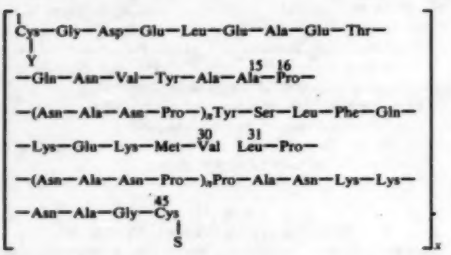
Continuation-in-part of Ser. No. 3,194, Jan. 14, 1987, Pat. No. 4,735,799. This application Dec. 29, 1987, Ser. No. 135,027

The portion of the term of this patent subsequent to Apr. 5, 2005, has been disclaimed.

Int. Cl.[5] A61K *39/00, 37/02;* C07K *7/10, 7/00*

U.S. Cl. 424—88 17 Claims

2. A polymeric compound of the formula



in which n is an integer from 1 to about 10 and x is an integer from 2 to about 50.

4,957,739

PHARMACEUTICAL COMPOSITIONS OF A 105 KD *P. HAEMOLYTICA* DERIVED ANTIGEN USEFUL FOR TREATMENT OF SHIPPING FEVER

Peter Berget, Pittsburgh Pa.; Michael Engler, Houston, Tex.; Sarah Highlander, Houston, Tex., and George Weinstock, Houston, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.

Filed Aug. 13, 1987, Ser. No. 85,430

Int. Cl.[5] A61K *39/102;* C07K *15/04*

U.S. Cl. 424—92 6 Claims

1. A pharmaceutical composition suitable for use as a vaccine comprising a therapeutically effective amount of a purified *P. haemolytica* antigen together with a pharmaceutically acceptable excipient, diluent or adjuvant, the antigen being purified from a cell-free *P. haemolytica* culture supernatant, or obtained by recombinant cloning of a gene encoding the antigen, the antigen being identified as having:

(a) binding affinity for immune sera obtained from a pasteurellosis infected cow;

(b) an approximate reference molecular weight of 105 K Daltons, the molecular weight being ascertainable by SDS polyacrylamide gel electrophoresis and immunoblot analysis; and

(c) immunological cross-reactivity with a 105 K *P. haemolytica* antigen having an amino terminal sequence of M-G-T-R-L-T-T-L-S-N- and a carboxy terminal sequence of -L-S-S-L-Q-F-A-R-A-A.

4,957,740

COMPOSITION FOR PREVENTING OR ALLEVIATING SKIN IRRITATION BY FORMULATIONS CONTAINING SUPEROXIDE DISMUTASE

Martin S. Wilder, Amherst, Mass., assignor to Centerchem, Inc., Tarrytown, N.Y. and Pentapharm, Ltd., Basle, Switzerland

Continuation of Ser. No. 666,677, Oct. 31, 1984, Pat. No. 4,695,456. This application Jun. 16, 1987, Ser. No. 63,143

Int. Cl.[5] A61K *37/48*

U.S. Cl. 424—94.4 4 Claims

1. A topical formulation for the control of dermal chemical irritation, dermal inflammation or acne, comprising:

3.0% of polyoxyethyleneglyceryl monostearate

2.0% of glyceryl distearate

3.0% of cetyl alcohol

6.0% of stearic acid

10.0% of isopropyl myristate

5% of fatty acid triglyceride

0.2% of p-hydroxybenzoic acid ester

2.0% of glycerol

2.0% of propylene glycol

0.3% of preserving agent

5.0% of SOD-containing tissue extract with 20,000 PIU per ml, and

61.5% of demineralized water.

4,957,741

METHOD FOR THE TREATMENT OF GASTRIC ULCER

Ahmad R. Kamarei, Lexington; Nicholas Catsimpoolas, Newton Center; Robert McCluer, Acton, all of Mass.; Takashi Mise, Yokohama, Japan, and Robert S. Sian, New York, N.Y., assignors to Angio-Medical Corp., New York, N.Y.

Filed Aug. 2, 1988, Ser. No. 227,533

Int. Cl.[5] A61K *35/30, 35/12, 31/70*

U.S. Cl. 424—551 3 Claims

1. Method for treating a gastric ulcer comprising administering to a patient with a gastric ulcer an amount of a pharmacological active mixture of bovine brain ganglioside sufficient to heal said ulcer.

4,957,742

METHOD FOR PROMOTING HAIR GROWTH

David R. Knighton, Hudson, Wis., assignor to Regents of the University of Minnesota, Minneapolis, Minn.

Continuation-in-part of Ser. No. 39,776, Apr. 15, 1987, which is a continuation of Ser. No. 786,206, Oct. 10, 1985, abandoned, which is a continuation-in-part of Ser. No. 676,471, Nov. 29, 1984, abandoned. This application Jan. 10, 1989, Ser. No. 295,406

Int. Cl.[5] A61K *35/14*

U.S. Cl. 424—532 11 Claims

1. A method of promoting hair growth comprising:

releasing material from activated platelets; and applying a composition topically to tissue containing hair follicles, said composition comprising said material released from said activated platelets, said compositions being applied in an amount sufficient to cause growth of hair from said tissue.

4,957,743

METHOD FOR TREATING HERPES

Helmut Keller, Blumenstrasse 032, D-8646 Nordhalben, Fed. Rep. of Germany

Filed Jul. 31, 1986, Ser. No. 892,226
Claims priority, application European Pat. Off., Jul. 31, 1985, 85109616.4; Jul. 31, 1985, 85109617.2
Int. Cl.[5] A61K *35/78*
U.S. Cl. 424—195.1 4 Claims

1. A method for treating herpes comprising administering to a host afflicted by same juice of the aqueous solution of juice extracted from *Dionaea muscipula*.

4,957,744

CROSS-LINKED ESTERS OF HYALURONIC ACID

Francesco della Valle, Padova, and Aurelio Romeo, Rome, both of Italy, assignors to Fidia, S.p.A., Abano Terme, Italy

Filed Oct. 13, 1987, Ser. No. 106,658
Claims priority, application Italy, Oct. 13, 1986, 48546-A/86
The portion of the term of this patent subsequent to Jul. 25, 2006, has been disclaimed.
Int. Cl.[5] A61K *31/70*; C07G *3/00*; C07H *1/00*
U.S. Cl. 424—401 91 Claims

1. Total or partial cross-linked esters of hyaluronic acid with an aliphatic polyhydric alcohol, and salts of such partial esters with inorganic or organic bases, with the proviso that said cross-linked ester is not the cross-linked ester of hyaluronic acid with an alomethyloxirane or a bisepoxy compound

14. A pharmaceutical composition comprising an effective amount of a cross-linked ester according to claim 1 together with a pharmaceutically acceptable carrier, excipient or diluent.

18. A cosmetic article comprising as a cosmetic vehicle a cross-linked ester or a salt thereof according to claim 1.

4,957,745

PHARMACEUTICAL PREPARATION

Ulf E. Jonsson; John A. Sandberg, both of Mölndal, and John A. Sjogren, Mölnycke, all of Sweden, assignors to Aktiebolaget Hassle, Molndal, Sweden

Continuation of Ser. No. 907,510, Sep. 12, 1986, abandoned. This application Feb. 14, 1989, Ser. No. 310,489
Claims priority, application Sweden, Oct. 11, 1985, 8504721
Int. Cl.[5] A61K *9/22, 9/36*
U.S. Cl. 424—461 21 Claims

1. Controlled release preparation comprising a plurality of beads having a soluble component comprising at least 95% weight/weight of a salt of metoprolol which has a solubility of less than 600 mg/ml in water at 25° C. and a metoprolol permeable polymeric membrane coating surrounding each of said beads, said coating consisting essentially of ethylcellulose or a mixture of ethylcellulose and hydroxypropylmethylcellulose wherein the coating is present in amounts such that the metoprolol is released through the coating over a period of at least 15 hours virtually independent of pH in the interval pH 1–8.

4,957,746

PROCESS FOR PREPARING ETOFIBRATE OR SIMILAR COMPOUNDS CONTAINING SUSTAINED RELEASE MICROGRANULES AND PRODUCTS THUS OBTAINED

Roberto Valducci, Via del Sole, 4, Savignano Sul Rubicone, Italy 47039

Continuation of Ser. No. 746,969, Jun. 20, 1985, abandoned. This application Sep. 22, 1988, Ser. No. 247,914
Claims priority, application Itaiy, Jun. 29, 1984, 3511 A/84
Int. Cl.[5] A61K *9/16*
U.S. Cl. 424—490 18 Claims

1. A process for preparing encapsulated sustained release etofibrate formulations comprising:

(a) mixing powdereed etofibrate with a solvent, working said etofibrate and said solvent in a rotating pan;

(b) sieving the contents of said rotating pan from step (a) to recover a first product comprising first microgranules;

(c) returning said first product to said rotating pan and working said first product in said rotating pan;

(d) removing the solvent from and drying the contents of said rotating pan from step (c)f

(e) sieving the dried contents of said rotating pan from step (d) to recover a second product comprising second microgranules, said second microgranules having diameters smaller than those of said first microgranules;

(f) placing said second product in said rotating pan and coating said second product with a mixture of etofibrate and polyethylene glycol such that the total etofibrate content of the coated microgranules subsequently recovered in step (g) is within the range of 89–98% by weight based on the weight of said microgranules said total etofibrate content achieved through the serial addition of etofibrate with intermediate sieving and return of the sieving and return of the sieved material for additional coating with etofibrate;

(g) sieving the contents of said rotating pan from step (f) to recover a third product comprising third microgranules, said third microgranules having diameters between 400 and 2000 microns; and

(h) encapsulating said third microgranules.

4,957,747

METHOD OF TREATING AGED SKIN

Werner K. Stiefel, Coral Gables, Fla., assignor to Stiefel Laboratories, Inc., Coral Gables, Fla.

Filed May 15, 1989, Ser. No. 351,825
Int. Cl.[5] A61K *33/08*
U.S. Cl. 424—691 8 Claims

1. A method of improving the firmness and tone of aged skin which comprises repeatedly applying to the aged skin a fluid topical composition containing from about 35%–65% by weight of said composition a suspension of fine particles of a non-absorbable aluminum oxide abrasive in a topically acceptable aqueous base comprising sodium cocoisethionate, at least one emollient, and a suspending agent.

4,957,748

RUMINANT FEED, METHOD OF MAKING AND METHOD OF USING

Thomas S. Winowiski, Mosinee, Wis., assignor to The Board of Regents of the University of Nebraska, Lincoln, Nebr.

Filed Mar. 23, 1987, Ser. No. 28,969
Int. Cl.[5] A23K *1/18*
U.S. Cl. 426—2 34 Claims

1. A feed for ruminants comprising a mixture of organic materials including at least one reaction product of a feed protein and a reducing carbohydrate, wherein the percentage of reducing carbohydrate on feed protein is about 0.5 percent to about 40 percent by weight such that degradability of the feed protein by rumen microorganisms is reduced and there is no significant reduction of protein digestibility in the post rumen tract.

4,957,749

PROCESS FOR REMOVING OXYGEN IN FOODSTUFFS AND DRINKS

Jean-Paul Pricels; Charles Maschelein, and Marc Heilporn, all of Brussels, Belgium, assignors to Oleofina, S.A., Brussels, Belgium

Filed May 14, 1986, Ser. No. 863,269
Claims priority, application Luxembourg, May 22, 1985, 85910
Int. Cl.[5] A23L *3/00*
U.S. Cl. 426—10 14 Claims

1. A process for preventing the oxidation of foodstuff materials capable of being degraded by oxidation with molecular oxygen, free radical oxygen, or combinations thereof compris-

ing incorporating into said foodstuff materials an amount of an enzyme composition sufficient to reduce the oxygen content of said foodstuff materials, wherein said enzyme composition comprises an oxidase and its corresponding substrate, catalase and superoxide dismutase.

4,957,750

MICROWAVEABLE BAKED GOODS

Stuart A. Cochran, East Windsor; David A. Cin, Cranbury, both of N.J., and Susan K. Veach, Petaluma, Calif., assignors to Kraft General Foods, Glenview, Ill.

Filed May 5, 1989, Ser. No. 348,326

Int. Cl.[5] A21D *2/36, 2/28*

U.S. Cl. 426—19 **14 Claims**

1. A baked good which will have improved palatability upon microwave heating, the improvement comprising the addition of protein modifier to the dough used to produce the baked good, said protein modifier being added at a level which will provide an amount free sulfhydryl group equivalent to 180–400ppm (flour basis) of L-cysteine and effective to reduce deterioration in the palatability of the baked good upon microwave heating.

4,957,751

METHOD OF PRODUCING RENNET CHEESE FROM RAW MILK

Hanno Lehmann; Ilol Wasen, both of Oelde, Fed. Rep. of Germany, and Hubert Pointurier, Paris, France, assignors to Westfalia Separatnr AG, Oelde, Fed. Rep. of Germany

Filed Jul. 10, 1989, Ser. No. 377,511

Claims priority, application Fed. Rep. of Germany, Jul. 16, 1988, 3824167

Int. Cl.[5] A23C *19/00, 19/05*

U.S. Cl. 426—36 **8 Claims**

1. In a method of producing rennet cheese from raw milk, wherein raw milk is standardized, a precipitant and cultures are added to initiate a biological reaction, and after termination of the biological reaction, cheese mass is separated from whey, and denatured cheese fines are removed from the whey by separation or decantation, the improvement wherein the cheese fines are biologically acidified in whey or water, denatured proteins are removed from the whey by separation or decantation, whereby detrimental calcium is removed along with the separated liquid, the cheese fines are suspended in water or whey, the suspension is warmed for 5 to 10 minutes at 40° to 60 ° C., the pH is adjusted to form 6.5 to 7.0 and with a 10% neutralization agent to form a material, the material is heated to form 80° to 90° C. for 1 to 5 minutes to form a product, and the product is returned to the raw milk before it is standardized or it is removed.

4,957,752

PROCESS FOR PRODUCING KEFIR

Lilia N. Ivanova; Irina V. Rozhkova; Vera F. Semenikhina; Tatyana N. Knyazeva, all of Moscow, and Alexandr P. Chagarovsky, Odessa, all of U.S.S.R., assignors to Vsesojuzny Nauchno-Issledovatelsky I Konstruktorsky Institut Molochnoi Promyshlennosti, Moscow, U.S.S.R.

PCT No. PCT/SU88/00088, § 371 Date Dec. 15, 1988, § 102(e) Date Dec. 15, 1988, PCT Pub. No. WO88/08252, PCT Pub. Date Nov. 3, 1988

PCT Filed Apr. 20, 1988, Ser. No. 294,507

Claims priority, application U.S.S.R., Apr. 30, 1987, 4230674

Int. Cl.[5] A23C *9/13, 9/142*

U.S. Cl. 426—43 **4 Claims**

1. In a process for producing Kefir from cows milk, wherein the milk is purified, normalized with respect to the dry solids content, heat treated to sanitize the milk, kefir producing microorganisms are introduced into the milk to form a milk mixture, the milk mixture is fermented, the fermented milk mixture is cooled to a storage temperature and packed, the improvement which comprises;

(a) normalizing the dry solids content of the milk by ultrafiltration of at least a portion of the milk, to increase the content of dry solids in the milk by from 0.5–4.0% by weight;

(b) heat treating the normalized milk at a temperature of from 90° C. to 140° C.;

(c) cooling the heat treated milk;

(d) introducing a leaven comprising kefir producing microorganisms into the cooled milk;

(e) fermenting the cooled milk mixture containing the kefir producing microorganisms at a temperature of from 18° C.–25° C. until a fermented milk mixture with a pH in the range of 4.7–5.0 is formed; and

(f) further fermenting the fermented milk mixture with the pH in the range of 4.7–5, at a temperature of from 18°–20° C., to form a further fermented milk mixture with a pH in the range of 4.5–4.7.

4,957,753

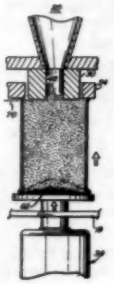
VACUUM PACKED GROUND COFFEE PACKAGE

Robert F. Bardsley, Harrington Park, and Eugene E. Corrigan, Edison, both of N.J., assignors to Tetley, Inc., Shelton, Conn.

Division of Ser. No. 939,957, Dec. 20, 1986, Pat. No. 4,804,550. This application Dec. 12, 1988, Ser. No. 282,036

Int. Cl.[5] B65D *43/00, 81, 20*; B65B *1/24*

U.S. Cl. 426—111 **2 Claims**



1. A vacuum packed ground coffee container comprising: a hermetically sealed, thin-walled cylindrically-shaped container having a storage chamber that is filled with a desired weight of compacted ground coffee under vacuum; said container having an annular wall with a smooth outer surface and end walls, at least one of said end walls being outwardly deformable and being in pressure contact with the compacted coffee, said compacted ground coffee having been compacted in said container against said one deformable end wall in an amount sufficient such that said one end wall has an outwardly collapsed segment that expanded the volume of the container in response to the compaction of coffee and to achieve a desired rigidity of the compacted coffee, so that said vacuum packed container of ground coffee has sufficient rigidity to stiffen the container in all directions and to avoid collapse of the container walls from atmospheric pressure.

4,957,754

CONTAINER FOR FOODS

Werner G. Munk, Vogt ueber Ravensburg; Manfred Klecker, Kuenzelsau-Morsbach, both of Fed. Rep. of Germany, and Franz Haas, Leobendorf, Austria, assignors to Suedmilch Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Dec. 17, 1987, Ser. No. 134,175

Claims priority, application Fed. Rep. of Germany, Dec. 18, 1986, 3643199

Int. Cl.[5] A21D *15/08*

U.S. Cl. 426—138 20 Claims

1. An edible container for food comprising a porous, vegetable material having on at least one part of its inner surface at least two different fatty impregnations, whereof at least one impregnation is a prime coat and at least one impregnation is an impermeable top glaze, wherein the prime coat has a higher setting temperature than the impermeable top glaze and the top glaze is more hydrophobic than the prime coat, and at least the impermeable top glaze is sugar-free.

4,957,755

METHOD FOR PRODUCING MICROWAVEABLE SNACKS

D. Richard Causey, P.O. Box 1110, Windsor, Calif. 95492

Filed Apr. 18, 1990, Ser. No. 510,547

Int. Cl.[5] A23L *1/00*

U.S. Cl. 426—242 4 Claims

1. A method for preparing pork rind snacks in a standard microwave oven comprising the steps of:

combining a quantity of pork rind pellets with a quantity of an effective popping agent in a microwaveable container, and heating the combined mixture in a microwave oven so that the popping of the popping agent mechanically mixes the pork rind pellets within the heating area of the microwave oven to enhance the popping of the pork rind pellets.

4,957,756

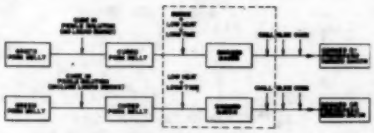
METHOD FOR PREPARING COOKED OR PRECOOKED BACON

John W. Olander, Montague, and Coralie George, Stockton, both of Calif., assignors to Schreiber Foods, Inc., Green Bay, Wis.

Continuation of Ser. No. 99,182, Sep. 21, 1987, abandoned. This application May 11, 1989, Ser. No. 350,295

Int. Cl.[5] A23B *4/01, 4/023;* A23L *1/318, 3/01*

U.S. Cl. 426—243 5 Claims



1. A method of imparting the organoleptic properties of bacon, which has been processed in a smokehouse, to a green pork belly without subjecting the green pork belly to a smokehouse process, the method comprising the steps of:

injecting pickle solution in a green pork belly to yield an injected green pork belly;

holding the injected green pork belly at a temperature and for a time period sufficient for said pickle solution to disperse in said injected green pork belly;

chilling the injected green pork belly;

after chilling the injected green pork belly, cutting the injected green pork belly into slices;

after cutting the injected green pork belly into slices subjecting said slices of pork belly to microwave radiation for a sufficient time to at least precook said pork belly such that the weight of said slices is no more than 45% of their green weight.

4,957,757

METHOD OF EXTENDING SHELF LIFE AND ENHANCING KEEPING QUALITY OF FRUITS

David M. Law; Peter J. Davies, and Martha A. Mutschler, all of Ithaca, N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Filed Apr. 26, 1988, Ser. No. 186,321

Int. Cl.[5] A23B *7/00*

U.S. Cl. 426—281 12 Claims

1. A method of extending the shelf life and of enhancing the keeping quality of whole ripened tomatoes which comprises the step of:

contacting said whole ripened tomatoes with amines selected from the group consisting of

naturally occurring monoamines;

naturally occurring polyamines;

naturally occurring precursors of monoamines;

naturally occurring precursors of polyamines;

naturally occurring non-toxic of said naturally occurring precursors of monoamines and said naturally occurring precursors of polyamines;

naturally occurring metabolites of monoamines;

naturally occurring metabolites of polyamines;

naturally occurring non-toxic salts of said naturally occurring metabolites of monoamines and said naturally occurring metabolites of polyamines;

analogues of naturally occurring monoamines;

analogues of naturally occurring polyamines; and

analogues of said naturally occurring non-toxic salts of said naturally occurring metabolites of monoamines and said naturally occurring metabolites of polyamines.

4,957,758

METHOD FOR REFINING OILS OR FATS

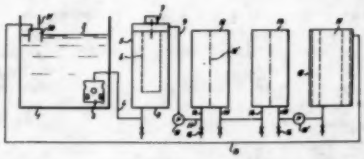
Jacob Drijftholt, Patrijzenhof 61, 1742 Be Schagen, and Johannes C. M. van den Berg, Kempenaar 03-03, 8242 Bd Lelystad, both of Netherlands

Filed Jul. 22, 1988, Ser. No. 222,863

Claims priority, application Netherlands, Jul. 24, 1987, 8701760

Int. Cl.[5] A23L *1/01*

U.S. Cl. 426—330.6 8 Claims



1. Method for refining oils or fats which are used in a container in the heated condition for cooking an edible product therein, which refining is carried out by passing the oil or the fat through a filter comprising a series of filter stages with decreasing pore size and matching flow capacity wherein said oil or fat is sucked through the first filter stage with a vacuum not exceeding 0.5 bar, characterized in that the oil or fat content of the container is always completely passed through a filter system and back into the container within a certain time after the start of the cooking process, which time is determined by the time required to prevent the formation of free fatty acids or fatty acid oxidation products.

4,957,759

METHOD FOR THE ULTRAPASTEURIZATION OF LIQUID WHOLE EGG PRODUCTS

Kenneth R. Swartzel; Hershell R. Ball, Jr., and Mohammad-Hossein Hamid-Samimi, all of Raleigh, N.C., assignors to North Carolina State University, Raleigh, N.C.

Continuation of Ser. No. 904,744, Sep. 8, 1986, Pat. No. 4,808,425. This application Feb. 16, 1989, Ser. No. 311,594
The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.
Int. Cl.[5] A23L *3/00*
U.S. Cl. 426—399 6 Claims

1. A method of making a packaged liquid whole egg product characterized by a preselected refrigerated shelf life of about four weeks to about 36 weeks, comprising passing the liquid whole egg product as a continuous stream through a pasteurizing apparatus, during which the liquid whole egg product is heated by contacting said liquid whole egg product to a heated surface for a predetermined time and to a predetermined temperature while at least periodically subjecting said continuous stream of liquid whole egg product to turbulence, wherein the liquid while egg product is heated for a predetermined time and to a predetermined temperature insufficient to cause more than a 5% soluble protein loss from said product, wherein the total thermal treatment received by the liquid whole egg product is described by an equivalent temperature and an equivalent time defining a point above the 5% SPL (BATCH) line of FIG. 3, and wherein said predetermined temperature and said predetermined time are chosen to impart said preselected shelf life to said liquid whole egg product, followed by aseptically packaging the liquid whole egg product.

4,957,760

ULTRAPASTEURIZATION OF LIQUID WHOLE EGG PRODUCTS WITH DIRECT HEAT

Kenneth R. Swartzel, Raleigh; Hershell R. Ball, Jr., New Hill, and Jeffery W. Liebrecht, Raleigh, all of N.C., assignors to North Carolina State University, Raleigh, N.C.

Filed Feb. 16, 1989, Ser. No. 312,066
Int. Cl.[5] A23B *5/005;* B65B *55/00*
U.S. Cl. 426—399 18 Claims

8. A method of ultrapasteurizing a liquid whole egg product while passing the product as a continuous stream through a pasteurizing apparatus, comprising:

(a) heating the product to a first predetermined temperature; then

(b) maintaining the product at said first predetermined temperature for a first predetermined holding time; then

(c) heating the product to a second predetermined temperature by injecting steam under pressure into said continuous stream, wherein the injected steam pressure is greater than the backpressure of said continuous stream, and wherein the backpressure of the continuous stream is at least about 10 p.s.i. greater than atmospheric pressure; then

(d) maintaining the product at said second predetermined temperature for a time sufficient to cause a nine log cycle reduction of *Listeria monocytogenes* in said product; then

(e) cooling said product; and

(f) aseptically packaging said product.

4,957,761

POTATO PRESERVATION METHOD

Douglas B. Hale, Boise, Id., assignor to Oppenheimer Companies, Boise, Id.

Continuation of Ser. No. 175,593, Mar. 29, 1988, abandoned, which is a continuation of Ser. No. 80,160, Jul. 29, 1987, abandoned, which is a continuation of Ser. No. 809,169, Dec. 16, 1985, abandoned. This application Apr. 18, 1989, Ser. No. 342,585
Int. Cl.[5] A23B *7/06, 7/148;* A23L *1/216*
U.S. Cl. 426—410 4 Claims

1. A method for preparing pre-cut uncooked potatoes for storage at refrigeration temperatures without the addition of preservatives, which consists essentially of the steps of:

(a) blanching pre-peeled, pre-cut potatoes to seal the outer surface without cooking the inside of the potatoes;

(b) rapidly cooling said blanched potatoes to an internal temperature of below 45° F.;

(c) drying said cooled potatoes to remove surface moisture;

(d) vacuum packaging said dried, uncooked potatoes in an inert gas, said cooled potatoes being maintained at a temperature of 35° to 38° F. during said drying and vacuum packaging; and,

(e) storing said vacuum-packaged potatoes at 34° to 38° F.

4,957,762

PROCESS FOR THE MANUFACTURE OF SHELF-STABLE OAT HOT CEREAL

Suja P. Finnerty, Arlington Heights, and Marvin K. Lenz, Algonquin, both of Ill., assignors to The Quaker Oats Company, Chicago, Ill.

Filed May 23, 1989, Ser. No. 356,865
Int. Cl.[5] A23L *1/168*
U.S. Cl. 426—457 9 Claims

6. A process for manufacture of hot oat cereals, comprising the steps: subjecting oat groats having a moisture level between 8–20%, inclusive, to high-temperature hot air treatment for a period of time from about 30–90 seconds, under temperature-time conditions sufficient to drop the moisture level of the groats to between about 3%, and 6%, inclusive; adding water to the resulting groats to bring the moisture level to between 8–12% inclusive; steaming the resulting groats to a moisture level of about 14–20% and flaking the resulting steamed groats; redrying the resulting flaked groats to a moisture level of about 9–14%, and packaging the resulting product; said adding water step taking place within 100 minutes after completion of the heating step, and said steaming and flaking taking place within 48 hours after the end of said adding water step.

4,957,763

COMPOSITE SWEETENING AGENT

Taketsugu Saita, and Junko Shindo, both of Tokyo, Japan, assignors to Kabushiki Kaisha Yakult Honsha, Tokyo, Japan

Filed May 25, 1989, Ser. No. 356,697
Claims priority, application Japan, May 30, 1988, 63-130161
Int. Cl.[5] A23L *1/236*
U.S. Cl. 426—548 2 Claims

1. A composite sweetening agent comprising: Aspartame and a galactooligosaccharide expressed by the formula: Gal-$(Gal)_n$-Glc wherein Gal denotes a galactose residue, Glc denotes a glucose residue and n denotes an integer from 1 to 4, in a ratio by weight of 1:17 to 1:200.

4,957,764

METHOD OF MANUFACTURING JELLY PRODUCTS HAVING FIBROUS TEXTURE

Shigeo Okonogi; Hiroya Yuguchi, both of Tokyo; Sumio Tanai, Yokohama, and Keiji Morimoto, Matsudo, all of Japan, assignors to Morinaga Milk Industry Co., Ltd., Tokyo, Japan

Filed Dec. 30, 1988, Ser. No. 292,341
Claims priority, application Japan, Mar. 11, 1988, 63-56130
Int. Cl.[5] A23L *1/05*
U.S. Cl. 426—573 3 Claims

1. A method of manufacturing jelly products having fibrous texture, wherein a plurality of liquid materials are separately prepared, then mixed and cooled for gelling to provide the fibrous texture for the jelly products, comprising:

separately preparing

(a) first liquid material, the pH of which is adjusted to 4.0 or less with edible acidic means, comprising at least one proteinaceous material selected from the group consisting of those originating from eggs, milk and soya beans in a quantity resulting in the protein content in the final products to be equal to or more than 0.02 wt. %, and

(b) a second liquid material, the pH of which results in the pH value of said first and second liquid materials when mixed to be equal to or less than 5.0, comprising at least one gum substance selected from the group consisting of xanthan gum, gum arabic and pullulane in a quantity resulting in the gum content in the mixture of said first and second liquid materials to be equal to or more than 0.02 wt. % and at least one gelling agent selected from the group consisting of agar-agar, furcellarane and carrageenan in a quantity resulting in the gelling agent content in the mixture of all the liquid materials to fall between 0.1–1.0 wt. %.

mixing said first and second liquid materials under moderate agitating condition so as to substantially eliminate turbulent flow at a temperature higher than the gelling temperature of the resultant mixture, determined by the gelling agent used, to form fibrous texture in the mixture; and

cooling the mixture to form a gel having fibrous texture.

4,957,765

CREAM BASED LIQUEURS

Craig C. Widmar; Dale Tripp, both of New York, N.Y., and Vincent G. Ficca, Princeton Jct., N.J., assignors to Joseph E. Seagram & Sons, Inc., New York, N.Y.

Continuation of Ser. No. 945,204, Dec. 22, 1986, abandoned, which is a continuation of Ser. No. 524,191, Aug. 18, 1983, abandoned. This application Nov. 9, 1987, Ser. No. 119,317

Int. Cl.[5] A23C *3/02, 13/12;* **C12G** *3/06;* **C12H** *1/18*

U.S. Cl. 426—586 **12 Claims**

1. A method for preparing a cream liqueur having improved emulsion stability, which comprises the steps of:

(a) admixing alcoholic beverage, a carbohydrate, and water to form an alcoholic beverage premix;

(b) admixing (i) one or more compounds selected from the group consisting of citric acid and alkali metal salts thereof, (ii) caseinate, and (iii) water to form a protein premix, the amount of citric acid or its salt or salts being sufficient to maintain the pH of the cream liqueur in the range of greater than 6.60 and less than 7.00;

(c) admixing the protein premix from step (b) with cream having a butterfat content of from about 38 to 52% by weight to form a protein/cream phase in the globules of butterfat are coated with caseinate;

(d) admixing the alcoholic premix from step (a) with the protein/cream phase of step (c) to form an emulsion of butterfat globules coated with caseinate in an aqueous alcohol phase; and

(e) treating the emulsion from step (d) to reduce the average diameter of the butterfat globules to less than about 5 microns.

4,957,766

PROCESS FOR MAKING BEER CONTAINING AN UNFERMENTED BEER PRODUCT

Adrianus H. Maria de Kort, Uithoorn, and Paul van Eerde, Zoetermeer, both of Netherlands, assignors to Heineken Technisch Beheer B.V., Amsterdam, Netherlands

Filed Sep. 6, 1988, Ser. No. 241,077

Claims priority, application Netherlands, Sep. 8, 1987, 8702125; Sep. 24, 1987, 8702279

Int. Cl.[5] C12G *3/08*

U.S. Cl. 426—592 **27 Claims**

1. Beer having an alcohol content of maximally 3.5% by volume, characterized in that it is a mixture devoid of green flavor of (A) beer obtained by means of a conventional fermentation and (B) unfermented wort product reconstituted with water, said wort product prior to reconstitution having a dry matter content of at least 50% by weight.

4,957,767

METHOD OF MAKING A NON-ALCOHOLIC BEER CONTAINING SPRAY-DRIED WORT

Andrianus H. Maria de Kort, Uithoorn, and Paul van Eerde, Zoetermeer, both of Netherlands, assignors to Heineken Technisch Beheer B.V., Amsterdam, Netherlands

Filed Sep. 6, 1988, Ser. No. 241,076

Claims priority, application Netherlands, Sep. 8, 1987, 8702126

Int. Cl.[5] A23L *2/38*

U.S. Cl. 426—590 **15 Claims**

1. Non-alcoholic beer, comprising unfermented wort reconstituted with water from wort powder, said wort powder being spray-dried wort having a maximum moisture content of 5% by weight, said reconstituted unfermented wort being free of the wortlike or green flavor characteristic of conventional wort-based non-alcoholic beers.

4,957,768

FOOD EMULSION

Christian E. Dutilh, Amsterdam, Netherlands, assignor to Unilever Patent Holdings B.V., London, England

Filed Feb. 16, 1989, Ser. No. 311,064

Claims priority, application European Pat. Off., Feb. 18, 1988, 88200292.6

Int. Cl.[5] A23D *7/00*

U.S. Cl. 426—604 **28 Claims**

1. A heat-sterilizable water and oil emulsion, which comprises a stabilizing amount of a mixture of a lyso-phospholipid and a lipid-binding protein.

4,957,769

ANIMAL FEED COMPOSITION AND METHOD OF MAKING SAME

Duane H. Theuninck, Elk River, Minn., and Daniel Downs, Detroit Lakes, both of Minn., assignors to Cargill, Incorporated, Minneapolis, Minn.

Division of Ser. No. 273,117, Nov. 16, 1988, Pat. No. 4,851,244, which is a continuation of Ser. No. 13,910, Feb. 12, 1987, abandoned, which is a continuation of Ser. No. 771,274, Aug. 30, 1985, abandoned. This application Apr. 14, 1989, Ser. No. 338,288

Int. Cl.[5] A23D *1/00*

U.S. Cl. 426—74 **13 Claims**

1. A rigid animal feed block consisting essentially of:

a rigidified blend of from about 30 to 80 percent by weight based upon the weight of the blend of an aqueous nutritive liquid;

from about 5 to about 40 percent by weight based upon the weight of the blend of a dry nutritive;

a colloid gel formed in an aqueous media from about 0.5 to about 15 percent by weight based upon the weight of the blend of a water soluble edible source of phosphorous and from about 1 to about 7 percent by weight based upon the weight of the blend of an edible trivalent metal salt having an ion selected from the group consisting of Fe^{3+}, Al^{3+} or Cr^{3+}; and

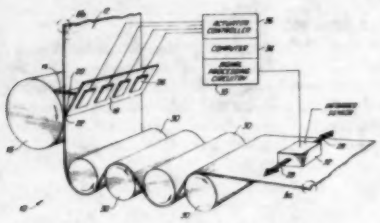
from about 1 to about 10 percent by weight based upon the weight of the blend of magnesium oxide mixed with the colloid gel in an amount sufficient to provide magnesium hydroxide and tie up water to rigidify the blend and provide and rigid feed block having a hardness of about 10 mm to about 100 mm.

4,957,770

COATING WEIGHT MEASURING AND CONTROL APPARATUS AND METHOD

John J. Howarth, Monte Sereno, Calif., assignor to Measurex Corporation, Cupertino, Calif.

Filed Jan. 27, 1989, Ser. No. 303,451
Int. Cl.[5] B05C 11/10
U.S. Cl. 427—9 20 Claims



1. A coating sensor for sensing a coating material on a substrate, wherein the coating material includes at least one component, the sensor comprising:

a radiation source disposed to direct a beam of radiation into the coated substrate;

a radiation receiver disposed to detect at least a portion of the beam emerging from the coated substrate, the receiver being configured to detect the amount of radiation in first and second separate wavelength regions of the radiation spectrum and to produce first and second signals therefrom, respectively indicative of the amount of detected radiation in the first and second regions, and wherein the first region is selected for radiation which is sensitive to the amount of substrate underlying the coating and the second region is selected for radiation which is approximately equally as sensitive as radiation in the first region to the amount of substrate underlying the coating, but which is also sensitive to the one component of the coating, the sensitivity of the radiation in the first region to the one component being different than the sensitivity of the radiation in the second region to the one component.

15. A method for sensing a coating material on a substrate, wherein the coating material includes at least one component, comprising steps of:

irradiating the coated substrate with radiation including wavelengths in at least first and second separate wavelength regions of the electromagnetic spectrum;

detecting the amount of radiation emitted from the substrate and coating material in the first and second separate regions, the first and second regions being selected such that the radiation in the first region is sensitive to the amount of substrate underlying the coating material and the radiation in the second region is approximately equally as sensitive to the amount of substrate underlying the coating material as the radiation in the first region, and further wherein the radiation in the first and second regions have unequal sensitivity to the amount of the one component in the coating.

4,957,771

ION BOMBARDMENT OF INSULATOR SURFACES

Carl L. Enloe, Bedford, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

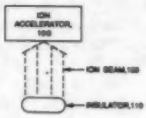
Filed Jul. 21, 1989, Ser. No. 384,192
Int. Cl.[5] B05D 3/06
U.S. Cl. 427—38 15 Claims

1. A process for treating high-voltage insulators in order to improve their flashover strength, said process comprising the steps of:

exposing the high-voltage insulators to a beam of high-energy metal ions which are emitted by an ion accelerator;

maintaining the beam of high-energy metal ions on the high-voltage insulator with a particle flux of up to approximately 5×10^{14} particles per second for a preselected duration; and

annealing the high-voltage insulators when said maintaining step is completed.

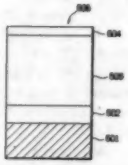


4,957,772

METHOD FOR FORMING FUNCTIONAL DEPOSITED FILMS BY MEANS OF MICROWAVE PLASMA CHEMICAL VAPOR DEPOSITION METHOD

Keishi Saitoh; Junichiro Hashizume, both of Nagahama; Shigehira Iida, Ueno; Tetsuya Takei, and Takayoshi Arai, both of Nagahama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 130,448, Dec. 9, 1987, abandoned. This application Dec. 21, 1988, Ser. No. 287,666
Claims priority, application Japan, Dec. 12, 1986, 61-297421; Dec. 13, 1986, 61-296994
Int. Cl.[5] B05D 3/06; H01L 21/20
U.S. Cl. 427—39 8 Claims



1. A microwave plasma chemical vapor deposition process for the formation of a functional deposited film on a plurality of substrates by means of a microwave plasma chemical vapor deposition conducted in a substantially enclosed film-forming chamber, said film-forming chamber comprising a circumferential wall having an end portion thereof hermetically provided with a microwave introducing window to which a waveguide extending from a microwave power source is connected, said film-forming chamber having a discharge space and a plurality of rotatable cylindrical substrate holders therein, each of said substrate holders being capable of having one of said substrates positioned thereon, said substrate holders being substantially concentrically arranged in said film-forming chamber so as to circumscribe said discharge space, said film-forming chamber being provided with means for supplying a film-forming raw material gas into said discharge space and means for evacuating said film-forming chamber, comprising: (a) generating a plasma by microwave glow discharge in said film-forming raw material gas to form said functional

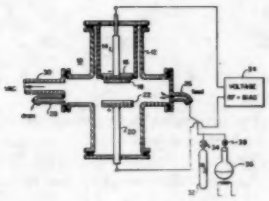
deposited film while rotating each of said cylindrical substrate holders; (b) maintaining the gaseous pressure of said discharge space at a value in the range of 0.1 to 1 mTorr; and (c) applying into said discharge space a microwave power from 1.1 to 5 times the minimum microwave power required to maximize the deposition rate for a decomposed product produced from said film-forming raw material gas to form a deposited film.

4,957,773

DEPOSITION OF BORON-CONTAINING FILMS FROM DECABORANE

James T. Spencer, Syracuse; Peter A. Dowben, Dewitt, and Yoon G. Kim, Syracuse, all of N.Y., assignors to Syracuse University, Syracuse, N.Y.

Filed Feb. 13, 1989, Ser. No. 309,213
Int. Cl.[5] B05D 5/12; C23C 16/34, 16/14, 16/48
U.S. Cl. 427—39 12 Claims



1. A process for depositing a boron nitride film onto a suitable substrate comprising:

supplying into a chamber that contains the substrate a gaseous mixture of decaborane and a nitrogen-based gas whose molecules contain at least one nitrogen atom, wherein said nitrogen-based gas is provided at a partial pressure that is several times as high as the partial pressure of said decaborane, and

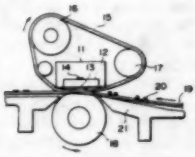
energizing the gaseous mixture in the chamber sufficiently to disassociate the nitrogen atoms from said molecules and to disassociate boron atoms from the decaborane, which then combine as said boron nitride film on said substrate.

4,957,774

METHOD OF HEAT-FIXING TONER IMAGE

Shinji Doi; Satoshi Yoshida, both of Kawasaki; Satoshi Matsunaga, Tokyo; Hiroaki Kawakami, Kawasaki; Takashige Kasuya, Tokyo; Yasuhide Goseki, and Yusuke Karami, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 13, 1989, Ser. No. 450,256
Claims priority, application Japan, Dec. 14, 1988, 63-316758; Dec. 15, 1988, 63-315021; Dec. 15, 1988, 63-316834; Dec. 15, 1988, 63-316836; Dec. 16, 1988, 63-316133; Dec. 16, 1988, 63-316139; Dec. 21, 1988, 63-324502
Int. Cl.[5] H01F 10/02; B05D 3/02
U.S. Cl. 427—45.1 39 Claims



1. A method of heat-fixing a visible image of toner to a recording medium, which comprises applying a toner image onto the recording medium, wherein

the toner to form said toner image or the resin component of the toner has the properties such that the melt viscosity η' measured by an overhead-type flow tester is from 10^3 to 10^6 poise at a temperature within the temperature range of from 120° C. to 150° C., and the absolute value of the inclination of a graph is not more than 0.50 ln (poise)/°C. when the natural logarithms lnη of the melt viscosities at 120° C. and 150° C. are plotted with respect to the temperatures; and

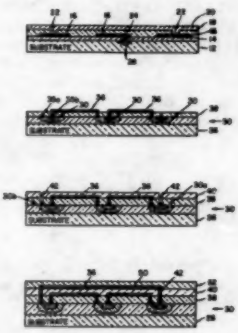
heat-fixing the toner image retained on the recording medium to the recording medium by use of a heater element as stationarily supported and a pressure member that brings said recording medium into close contact with said heater element through a film interposed between them.

4,957,775

METHOD AND APPARATUS FOR REFRACTORY METAL DEPOSITION

Jerry G. Black, Lincoln, and Daniel J. Ehrlich, Lexington, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation of Ser. No. 868,615, May 29, 1986, Pat. No. 4,756,927. This application Mar. 9, 1988, Ser. No. 165,927
Int. Cl.[5] B05D 3/06
U.S. Cl. 427—53.1 13 Claims



1. The process of providing interconnections for regions formed din substrates comprising the steps of:

(a) forming a layer on said substrate;

(b) forming openings through the layer to the substrate to regions to be interconnected;

(c) depositing a refractory metal in said openings and on said layer by pyrolysis of a mixture of an inert gas and WF_6, MoF_6 or TiC_4 and an Si containing gaseous compound using a low power laser beam to initiate and direct the interconnection pattern.

4,957,776

METHOD OF MANUFACTURING OPTICAL DISC

Masahiro Higuchi, Gode; Sadao Sakamoto, Ogaki, and Yoshiharu Uchihara, Anpachi, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

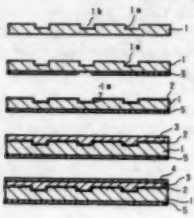
Filed Jan. 3, 1989, Ser. No. 293,748
Claims priority, application Japan, Jan. 14, 1988, 63-6357
Int. Cl.[5] B05D 3/06, 5/06
U.S. Cl. 427—54.1 12 Claims

1. A method of manufacturing an optical disc, comprising the steps of providing a disc substrate where information is recorded on one side;

first forming a warp prevention layer on the other side of said disc substrate;

second forming a beam reflection film on said one side of said disc substrate; and

third forming a protection film covering said beam reflection film, the step of first forming taking place before the step



of second forming so as to avoid deterioration in wettability of the other side of said disc substrate that would otherwise take place if the step of second forming were effected before the step of first forming.

4,957,777

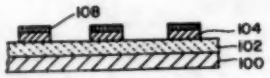
VERY LOW PRESSURE CHEMICAL VAPOR DEPOSITION PROCESS FOR DEPOSITION OF TITANIUM SILICIDE FILMS

Vida Ilderem, Puyallup, Wash.; L. Rafael Reif, Newton, and Prabha K. Tedrow, Lexington, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Oct. 12, 1989, Ser. No. 423,494

Int. Cl.[5] B05D *3/06*; **C23C** *16/42*

U.S. Cl. 427—55 **14 Claims**



11. A method of selectively forming titanium silicide in-situ over silicon regions of a patterned substrate in a cold walled reactor comprising the steps of:

(a) mounting a substrate having patterned regions comprising exposed oxide regions and exposed silicon regions on a holder in the reactor;

(b) bringing the pressure in the reactor to a relatively low pressure of about 67 mTorr, or less;

(c) selectively heating the substrate with radiant thermal energy to bring the substrate to a predetermined temperature of about 600° C. at which formation of a silicon film from a known reactant will occur on the substrate; while keeping the reactor walls at a substantially lower temperature;

(d) introducing a gaseous silicon atom containing reactant into the reactor to form a thin polysilicon layer on the patterned substrate;

(e) promptly selectively heating the substrate and polysilicon layer by radiant thermal energy to bring the substrate and thin polysilicon layer to a predetermined temperature of about 730 ° C. suitable for formation of a titanium silicide layer while maintaining the reactor walls at a substantially lower temperature;

(f) introducing a gaseous silicon atom containing reactant and a gaseous titanium atom containing reactant into the reactor to from a layer of titanium silicide only over the silicon regions by initially consuming the thin polysilicon layer until the oxide regions are once again exposed and continuing the reaction until the titanium silicide is formed only over the silicon regions by supplying silicon for the continuing formation from the gaseous silicon atom containing reactant without further substantial consumption of the remaining silicon in the silicon regions.

4,957,778

METHOD OF PRODUCING CHEMICALLY SELF-COPYING OR SELF-CONTAINING PAPER

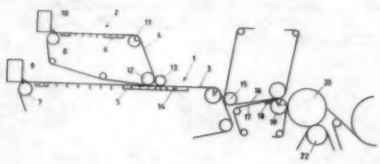
Olavi A. Yrjälä, Espoo, Finland, assignor to A. Ahlstrom Corporation, Karhula, Finland

Division of Ser. No. 284,309, Jun. 9, 1988, abandoned. This application Jul. 14, 1989, Ser. No. 380,036

Claims priority, application Finland, Jun. 16, 1987, 872681

Int. Cl.[5] B41M *5/16*

U.S. Cl. 427—152 **6 Claims**



1. A method of producing a chemically self-copying paper intended for use in the combinations of a top sheet (CB), bottom sheet (CF) and one or more interleaving sheets (CFB) or a chemically copying, self-containing paper, said method comprising the steps of:

couching together, while wet, two fiber layers manufactured in separate wire sections, the wire side of the upper fiber layer and the top surface of the lower fiber layer being couched together to form a couched web in which the upper fiber layer contains components inducing a color reaction; and

conveying said couched web through a single-felted press nip formed by a felt surface a smooth surface, so that said upper fiber layer containing the components inducing the color reaction contacts said smooth surface and said lower fiber layer contacts said felt surface.

4,957,779

METHOD FOR PRODUCING A PROTECTIVE LAYER ON A CERAMIC BODY

Virgil Irick, Jr., Hockessin; Jack A. Kuszyk, and Dennis J. Landini, both of Newark, all of Del., assignors to Lanxide Technology Company, LP, Newark, Del.

Filed Feb. 18, 1988, Ser. No. 157,432

Int. Cl.[5] B05D *3/00*

U.S. Cl. 427—193 **11 Claims**

2. A method for producing a self-supporting ceramic composite body comprising:

(a) providing a parent metal body;

(b) positioning said parent metal adjacent to a permeable mass of filler and orienting said parent metal and said filler relative to each other so that formation of said oxidation reaction product will occur in a direction towards and into said mass of filler;

(c) heating said parent metal body to a temperature above its melting point but below the melting point of its oxidation reacton product to form a body of molten parent metal and, at said temperature,

(1) reacting the molten parent metal with an oxidant to form an oxidation reaction product of the parent metal,

(2) maintaining at least a portion of said oxidation reaction product in contact with and between said body of molten metal and said oxidant, to progressively draw molten metal from said body of molten metal through the oxidation reaction product towards the oxidant and towards and into the adjacent mass of filler so that fresh oxidation reaction product continues to form within the

mass of filler at an interface between the oxidant and previously formed oxidation reaction product, and

(3) continuing said reacting for a time sufficient to form a first ceramic composite body;

(d) exposing said first ceramic composite body to an environment comprising glassy particles which causes growth of a layer from at least a portion of a surface of said first ceramic composite body; and

(e) continuing said exposure in step (d) for a time sufficient to form a protective layer on at least a portion of said first ceramic composite body.

4,957,780

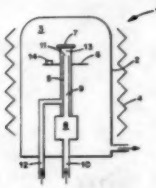
INTERNAL REACTOR METHOD FOR CHEMICAL VAPOR DEPOSITION

Vinod K. Sarin, Lexington, Mass.; Charles D'Angelo, Southboro, and Helen E. Rebense, Westboro, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Division of Ser. No. 206,400, Jun. 14, 1988, Pat. No. 4,890,574, which is a continuation-in-part of Ser. No. 5,003, Jan. 20, 1987, Pat. No. 4,751,109. This application Sep. 15, 1989, Ser. No. 407,980

Int. Cl.[5] C23C *16/00*

U.S. Cl. 427—255.2 **6 Claims**



1. A chemical vapor deposition process comprising the steps of:

disposing an internal reactor within a chemical vapor deposition reactor comprising means for enclosing a reaction chamber and means for heating the reaction chamber, at a position relative to the heating means selected to provide control of the temperature within the internal reactor;

placing at least first and second solid precursor materials in the internal reactor;

placing a substrate in the reaction chamber;

contacting the solid precursor materials with at least one precursor gas, reactive with the solid precursor materials to produce at least two first reactant gases; and

directing the at least two first reactant gases to the reaction chamber to react with one or more additional reactants to form a product, and to deposit a layer of the product on the substrate.

4,957,781

PROCESSING APPARATUS

Masatomo Kanegae; Takayoshi Kogano, and Fumio Ito, all of Tokyo, Japan, assignors to Hitachi, Ltd.; Hitachi VLSI Engineering Corp. and Hitachi Tokyo Electronics Co., all of Tokyo, Japan

Continuation of Ser. No. 6/888,071, Jul. 22, 1986, abandoned. This application Jun. 2, 1988, Ser. No. 201,442

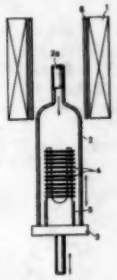
Claims priority, application Japan, Jul. 22, 1985, 60-160236

Int. Cl.[5] C23C *16/00*

U.S. Cl. 427—255.3 **64 Claims**

1. A method for treating semiconductor wafers using a vertical thermal treatment furnace, the thermal treatment furnace including cylindrical heating means having a cylindrical cavity therethrough lengthwise in which the semiconductor wafers are situated during a thermal treatment in the vertical thermal treatment furnace, the cavity having an axis which extends substantially in the vertical direction, the cavity having an opening, for loading and unloading wafers, disposed at one end thereof, the furnace also including a wafer holder for loading and unloading the wafers into and out of the cavity, the wafers being supported by the wafer holder and disposed along the axis of the cavity, the method comprising steps of:

(a) arranging the wafers, that are supported by the wafer holder, into a cylindrical process tube, the process tube having a diameter smaller than the cavity, the arranging the wafers in the process tube being performed with the process tube substantially outside the cavity;



(b) moving the wafers relative to the cavity, supported by the wafer holder, so as to position the wafers in the cavity, the wafers being moved into the cavity through the opening, both the process tube and wafers being moved to position the wafers in the cavity;

(c) heat-treating the wafers in the cavity at a predetermined temperature; and

(d) unloading the wafers in the cavity out of the cavity, through said opening.

4,957,782

METHOD FOR AUTOMATIC SEQUENTIAL COATING OF WORKPIECES

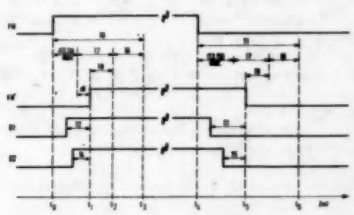
Eberhard Medler, Sindelfingen; Siefried Phillipi, Calw-Hirsau; Kurt Vetter, Remseck; Ludwig Freudenreich, Ulm-Erningen, all of Fed. Rep. of Germany, and Othmar Lippuner, Wettlingen/Schweiz, Switzerland, assignors to Behr Industrieanlagen GmbH & Co. and Daimler-Benz AG, both of, Fed. Rep. of Germany

Division of Ser. No. 186,179, Apr. 26, 1988. This application Jan. 29, 1990, Ser. No. 471,419

Claims priority, application Fed. Rep. of Germany, Apr. 27, 1987, 3713999

Int. Cl.[5] B05D *1/02*

U.S. Cl. 427—421 **6 Claims**



1. A method for automatically coating workpieces using a spraying device controlled by a stored operating program, said method comprising the steps of producing at least one switch-

ing signal for controlling a fluid flow to the spraying device at predetermined times in response to a stored predetermined delay time between the production of the switching signal and the response of the fluid flow and the relative movements between the spraying device and the workpiece; characterized by including the steps of measuring the actual delay time between the production of the switching signal and the response of the fluid flow during the coating operation; comparing the actual delay time with the stored delay time; and adjusting the stored delay time in the operating program in response to the comparison in the event the difference between the actual delay time and the stored delay time exceeds a predetermined value.

4,957,783

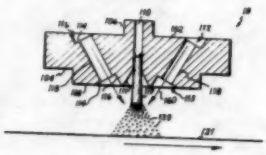
METHOD AND APPARATUS FOR DISPENSING DROPLETS OF MOLTEN THERMOPLASTIC ADHESIVE

Gregory J. Gabryszewski, Lithonia, Ga., assignor to Nordson Corporation, Westlake, Ohio

Continuation-in-part of Ser. No. 254,264, Oct. 5, 1988, Pat. No. 4,911,956. This application Sep. 27, 1989, Ser. No. 411,181

Int. Cl.[5] B05D *1/02*; B05B *1/08*

U.S. Cl. 427—424 **14 Claims**



1. The method of depositing molten thermoplastic material onto a substrate, comprising:

ejecting a continuous stream of molten thermoplastic material from a discharge outlet, said stream having momentum in a direction toward the substrate and having an exterior surface;

intermittently impacting said stream of molten thermoplastic material with a jet of atomizing air which initially contacts said exterior surface of said stream to shear said stream of molten thermoplastic material into droplets;

controlling the energy with which said jet of atomizing air impacts said stream so that said droplets are allowed to fall onto the substrate under the influence of gravity and due to the momentum of said stream, said droplets being deposited onto the substrate in a pattern wherein said droplets are substantially uniformly spaced from one another and are of substantially uniform size.

4,957,784

MANUFACTURED ARTICLE FOR INSTANTANEOUSLY MAKING DECORATIVE BOWS AND THE LIKE

Ruggero Ripamonti, Osnago, Italy, assignor to Nastrificio Lombardo S.R.L., Milan, Italy

Filed May 31, 1989, Ser. No. 359,990

Claims priority, application Italy, Feb. 28, 1989, 20647/89[U]

Int. Cl.[5] D04D *7/10*

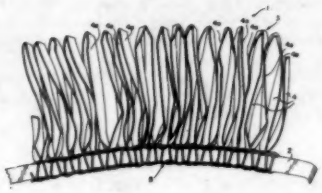
U.S. Cl. 428—5 **2 Claims**

1. A manufactured article for instantaneously making decorative bows and the like, comprising:

a flexible support ribbon;

a decorative flexible band formed by ribbon-like element folded back so as to form a plurality of loops consecutively disposed in side by side relationship;

at least a stitching made all around the support ribbon and engaging each of said loops in the region of their ends, said stitching being slidable along the flexible support ribbon from a condition of maximum extension in which the loops are consecutively disposed side by side, to a condition of minimum extension in which the loops are homogeneously gathered whereby a bow having a substantially spherical configuration is formed.



4,957,785

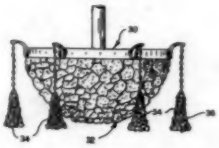
LIGHT TRANSMISSIVE STONE STRUCTURE AND METHOD FOR MAKING SAME

Michael R. Fornadley, 208 Heston Dr., Mars, Pa. 16046

Filed Mar. 25, 1988, Ser. No. 173,272

Int. Cl.[5] B44F *1/06*; G02B *5/08*

U.S. Cl. 428—15 **10 Claims**



1. A light transmissive structure comprised of one of a transparent back and a translucent back and a light transmissive material selected from the group consisting of gems, ores and rocks mounted on said back with methacrylic adhesive which is clear and translucent after hardening will not discolor and when assembled the structure will withstand normal handling and mounting without breaking.

4,957,786

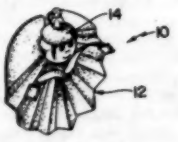
METHOD OF MAKING DOLL AND DOLL THEREBY FORMED

Lorraine Barboza, 75 N. Main St., Assonet, Mass. 02702

Filed Jan. 30, 1990, Ser. No. 472,302

Int. Cl.[5] A63H *3/16*; B32B *31/10*

U.S. Cl. 428—16 **12 Claims**



1. A method of making a doll comprising the steps of:

(a) forming a skirt portion from a substantially circular, substantially rigid, thin, formable sheet by cutting three closely spaced substantially parallel slits in said sheet, said slits extending inwardly in said sheet to substantially the center thereof and defining a pair of elongated narrow

strips, the remainder of said sheet defining a main portion having a substantially circumferential perimeter and first and second substantially radially extending inner edges, forming said main portion into an at least partially conical configuration wherein the portions of said first and second inner edges which are adjacent said perimeter are in closely adjacent relation, and bending said strips outwardly in opposite directions in spaced relation to the outer surface of said main portion so that the connected ends of said strips and said inner edges cooperate to define an aperture in said skirt portion;

(b) forming a character figure portion including a body portion which is dimensioned and configured to be received in the interior of said main portion, a head portion and an elongated neck portion extending between said body portion and said head portion;

(c) assembling said character figure portion with said skirt portion so that said body portion is received in the interior of said skirt portion and said neck portion extends through said aperture to position said head portion above said skirt portion.

12. A doll formed by the method of claim 1.

4,957,787

ARTIFICIAL FLOWER

Linda P. Reinhardt, Clinton, Ohio, and W. Brent Burleson, Pittsburgh, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 110,147, Oct. 19, 1987, abandoned. This application Sep. 27, 1988, Ser. No. 250,015

Int. Cl.[5] A41G *1/00*; B32B *3/26*

U.S. Cl. 428—24 **27 Claims**

1. In an artificial flower comprising at least one artificial petal, the improvement wherein said artificial petal comprises microporous material which comprises:

(a) a matrix consisting essentially of essentially linear ultrahigh molecular weight polyolefin which is essentially linear ultrahigh molecular weight polyethylene having an intrinsic viscosity of at least about 18 deciliters/gram, essentially linear ultrahigh molecular weight polypropylene having an intrinsic viscosity of at least about 6 deciliters/gram, or a mixture thereof; said matrix comprising regions of stretch-induced molecularly oriented ultrahigh molecular weight polyolefin distributed throughout said matrix,

(b) finely divided particulate substantially water-insoluble siliceous filler distributed throughout said matrix, said filler constituting from about 50 percent to about 90 percent by weight of said microporous material, and

(c) a network of interconnecting pores communicating throughout said microporous material, said pores constituting more than 80 percent by volume of said microporous material.

4,957,788

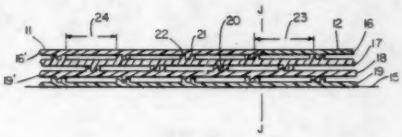
SHOCK RELIEVING PAD

Richard C. Colonel, P.O. Box 2192, Renton, Wash. 98056, and Devere V. Lindh, 1910 Dogwood Dr., SE., Auburn, Wash. 98002

Continuation-in-part of Ser. No. 138,607, Dec. 28, 1987, abandoned. This application Jun. 29, 1989, Ser. No. 373,240

Int. Cl.[5] F16B *2/00*

U.S. Cl. 428—33 **8 Claims**



1. A pad comprising:

a plurality of layers of resilient material,

a plurality of compression members,

said layers being interconnected and spaced apart by said compression members,

whereby said layers are combined into a stack of said layers, said stack having:

first and second outside layers and

at least one intermediate layer,

said layers having first and second sides and projections extending from at least one of said first and second sides of said outside layers and from said first and second sides of said at least one intermediate layer,

said projections being shaped and positioned such that cooperative engagement of said projections on adjacent layers comprises said compression members and such that said compression members have spaces between them and said compression members on said first side of said at least one intermediate layer are opposite said spaces on said second side of said at least one intermediate layer.

4,957,789

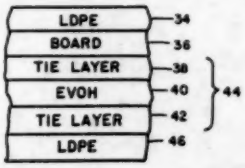
NON-FOIL COMPOSITE STRUCTURES FOR PACKAGING JUICE

Charles E. Gibbons; Cynthia L. Tanner, and Allan A. Whillock, all of Mobile, Ala., assignors to International Paper Company, Purchase, N.Y.

Continuation of Ser. No. 373,964, Jun. 27, 1989, abandoned. This application Nov. 13, 1989, Ser. No. 434,636

Int. Cl.[5] B65D *85/00*

U.S. Cl. 428—34.2 **42 Claims**



1. A container for liquids containing essential oils and flavors, said container having an interior and an exterior, said container constructed from a laminate comprising:

(a) a paperboard substrate with inner and outer surfaces, said inner surface being closer to the interior of the container than said outer surface;

(b) a 12 lb. outer layer of a heat-sealable low density polyethylene polymer exterior to said outer surface of said paperboard substrate;

(c) a coextruded sandwich layer comprising a 4.5 lb. tie

layer, a 4.0 lb. heat-scalable ethylene vinyl alcohol copolymer layer and a 4.5 lb. tie layer interior to said inner surface of said paperboard substrate; and

(d) a product-contact layer of a 10 lb. heat-sealable low density polyethylene polymer interior to said outer surface of said inner sandwich layer of tie layer—ethylene vinyl alcohol copolymer—tie layer whereby said laminate can be heat-sealed on conventional equipment at temperatures ranging from 250° F–500° F.

4,957,790

ORIENTED POLYMERIC FILMS

Thomas C. Warren, Greer, S.C., assignor to W. R. Grace & Co.-Conn., Duncan, S.C.

Filed Dec. 21, 1987, Ser. No. 136,054

The portion of the term of this patent subsequent to Jan. 10, 2006, has been disclaimed.

Int. Cl.[5] B65B *53/00*

U.S. Cl. 428—34.9 **19 Claims**

1. A multilayer heat-shrinkable (oriented) film comprising at least one layer of cross-linkable polymer, said layer (1) (originally) containing a pro-rad agent and (2) being irradiated, both being to an extent sufficient to provide an amount of cross-linking effective to accomplish an increased orientation rate.

4,957,791

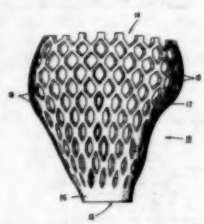
PACKING SLEEVE

Alfred H. Richter, Arcadia, Calif., assignor to Richter Manufacturing Corporation, Pomona, Calif.

Filed Sep. 29, 1988, Ser. No. 251,505

Int. Cl.[5] B65D *33/01*; B32B *3/10*

U.S. Cl. 428—35.5 **15 Claims**



1. A packing sleeve for protectively packaging products such as produce, the sleeve having an open inlet end, an opposed open retaining end, and a longitudinally extending body therebetween, a substantial portion of the body having a plurality of slits circumferentially spaced around the body so that the inlet end and a substantial portion of the body are radially expandable to accommodate a product having a circumference larger than the non-expanded circumference of the packing sleeve, the retaining end of the packing sleeve being substantially non-expandable so as to prevent products having a circumference larger than the non-expanded circumference of the retaining end from falling through the retaining end.

4,957,792

SELF-MOLDING HOSE AND A CONTINUOUS VULCANIZATION METHOD

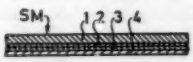
Yokohori Shizuo; Miyamoto Kenzo, both of Hyogo; Fukushima Koji, Osaka; Tsujimoto Masami, Hyogo; Onda Kenji, Fukushima, and Sato Kan, Tokyo, all of Japan, assignors to Toyo Tire & Rubber Co., Ltd., Osaka, Japan

Filed Nov. 8, 1988, Ser. No. 268,573

Claims priority, application Japan, Nov. 9, 1987, 62-282700; Jul. 11, 1988, 63-173120; Aug. 3, 1988, 63-194132; Aug. 9, 1988, 63-199299

Int. Cl.[5] F16L *11/12*

U.S. Cl. 428—36.2 **8 Claims**



1. A self-molding hose of the type which may have any of various shapes and comprise any of various elastomers and reinforcing fabrics, said self-molding hose charcterized in that said self-molding hose is made from a self-molding part comprising:

a heat shrinkable woven fabric;

a first vulcanized elastomer topping layer provided on top surface of said heat shrinkable woven fabric;

a second vulcanized elastomer topping layer provided on an underside surface of said fabric, said second vulcanized elastomer topping layer being thinner than said first vulcanized elastomer topping layer; and

an unvulcanized elastomer topping layer provided on the underside of said second vulcanized elastomer topping layer.

4,957,793

WASTE PIPE SYSTEM COMPRISING PLASTIC PIPE PARTS MADE OF THERMOPLASTIC MATERIAL WITH SOUND-PROOFING PROPERTIES

Ali Guettouche, Haren, and Jürgen Graafmann, Lingen, both of Fed. Rep. of Germany, assignors to Wavin B. V., Netherlands

Continuation-in-part of Ser. No. 76,908, Jul. 23, 1987, abandoned. This application Dec. 9, 1988, Ser. No. 282,865

Claims priority, application Netherlands, Jul. 23, 1986, 8601910

Int. Cl.[5] F16L *9/22*

U.S. Cl. 428—36.4 **7 Claims**

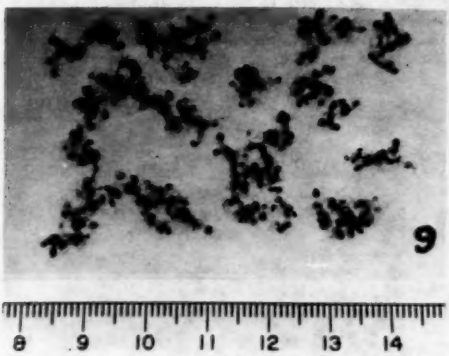
1. A waste pipe system for discharging hot and cold waste water comprising a plurality of extruded or injection molded thermoplastic pipe parts, said thermoplastic material being characterized by the absence of plasticizers and selected from the group consisting of polyvinylchloride, polypropylene and acrylonitrile butadiene styrene copolymer (ABS), the inner surface of said thermoplastic pipe part coming into contact with the liquid waste, the outer surface of said thermoplastic pipe part characterized by the absence of a soundproofing casing, the level of noise in such a pipe system when conveying waste liquid through the pipes being reduced by using a pipe of thermoplastic material wherein the weight per unit area of the plastic pipe part is at least 8 kg/m^2 and the density is between 1.8 and 2.7 g/cm^3.

4,957,794

ARAMID FLUFF

Thomas I. Bair, Wilmington, Del., assignor to E. I. DuPont de Nemours and Company, Wilmington, Del.

Filed Jan. 2, 1990, Ser. No. 460,256
Int. Cl.[5] B32B 5/12
U.S. Cl. 428—74 17 Claims



1. Aramid fiber fluff comprising aramid fibers with an extended length of 0.4 to 3 centimeters and having at least two out-of-plane crimps along their length, the fluff exhibiting a density of less than 0.08 g/cc at a load of 0.26 N/cm^2.

4,957,795

ABSORBENT ELASTOMERIC WOUND DRESSING

John E. Riedel, Hugo, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 194,082, May 13, 1988, abandoned. This application Jan. 24, 1990, Ser. No. 469,708
Int. Cl.[5] A61F 13/46; A61L 15/20; D04H 1/72; B32B 5/04, 5/08
U.S. Cl. 428—74 27 Claims

1. An elastomeric nonwoven absorbent web comprising a nonwoven fibrous matrix of about 10 to 20 weight percent elastomeric melt-blown small diameter fibers and about 10 to 30 weight percent absorbent staple fibers or about 5 to 20 weight percent absorbent polymeric particulate material, about 30 to 60 weight percent wicking staple fibers, and about 10 to 30 weight percent crimped bulking staple fibers dispersed throughout the matrix.

4,957,796

LINING AND COVER FOR AUTOMOBILES

Helmut Pelzer, Neue Strasse 5, D-5804 Herdecke-Ende, Fed. Rep. of Germany

Filed Dec. 20, 1988, Ser. No. 286,990
Claims priority, application Fed. Rep. of Germany, Dec. 22, 1987, 3743509
Int. Cl.[5] B32B 5/18, 7/04
U.S. Cl. 428—76 6 Claims

1. Foot cover for placement on the floor space of motor vehicles comprising a form part made of polyurethane foam material being provided with sealing lip means extending from edges and edge portions of said form part being integral therewith and thus made of polyurethane foam: and

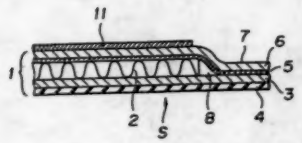
an insert which extends into the sealing lip from the form part for reinforcing the sealing lip and being embedded in the polyurethane foam material.

4,957,797

ROOF LINING STRUCTURE FOR MOTOR VEHICLE

Takashi Maeda; Tsuyoshi Yamashita, and Mitsuo Nakamura, all of Utsunomiya, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 9, 1989, Ser. No. 349,114
Claims priority, application Japan, May 9, 1988, 63-112111; May 10, 1988, 63-112778
Int. Cl.[5] B32B 7/00
U.S. Cl. 428—77 12 Claims



1. A roof lining structure in a motor vehicle having a roof panel, comprising:

a roof lining base member; and

a vibration-damping layer interposed between an upper surface of said base member and a lower surface of the roof panel, said roof lining base member comprising:

a support layer having a cellular structure;

a first covering layer disposed on a surface of said support layer which faces a passenger compartment of the motor vehicle;

a decorative layer disposed on a surface of said first covering layer which faces the passenger compartment; and

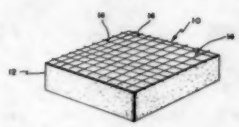
a reinforcing layer disposed at least partly in said roof lining base member.

4,957,798

COMPOSITE OPEN-CELL FOAM STRUCTURE

John Bogdany, Oglethorpe, Ga., assignor to Resilient System, Inc., Dalton, Ga.

Continuation-in-part of Ser. No. 163,010, Mar. 2, 1988, abandoned. This application Mar. 31, 1989, Ser. No. 331,183
Int. Cl.[5] B32B 3/26
U.S. Cl. 428—95 19 Claims



1. A carpet underlay cushion structure comprising:

a carrier layer of open-cell, resilient polyurethane foam material, said resilient foam material being substantially completely and uniformly impregnated with a latex containing a polymer wherein said polymer is selected from the group consisting of non-carboxylated styrene-butadiene rubber, natural rubber, and a combination of styrene-butadiene and natural rubbers;

the impregnated foam material being dried after said impregnation to produce a foamed, open-cell, resilient composite cushion structure wherein the open cells thereof partially comprise said carrier layer of polyurethane foam material.

4,957,799

REINFORCING LAYERS FOR BIAS TIRES

Jiro Miyamoto, Itami; Takashi Nakasai, Takarazuka, and Yukio Komai, Kunta, Japan, assignors to Toyo Tire & Rubber Co., Ltd., Osaka, Japan

Filed Aug. 31, 1988, Ser. No. 238,817
Claims priority, application Japan, Aug. 31, 1987, 62-218154
Int. Cl.[5] B60C 9/20; B32B 5/12
U.S. Cl. 428—114 3 Claims

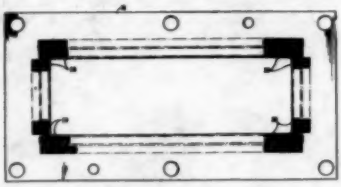
1. Reinforcing layers for bias tires including at least two cord plies disposed radially outwardly of a carcass layer, said cord plies comprising a steel cord ply and at least one ply of composite cord plies made of aramid yarns and nylon yarns and having a nominal total denier of 4,000–10,000, said composite cord ply being laminated radially outwardly of said steel cord ply, wherein a cord space is maintained between steel cords and composite cords in the range of 0.5–5.0 times the diameter of the steel cords.

4,957,800

METHOD OF CONSTRUCTING A MONOLITHIC BLOCK HAVING AN INTERNAL GEOMETRY AND THE BLOCK RESULTING THEREFROM

Dimitry G. Grabbe, Middletown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jun. 27, 1989, Ser. No. 372,406
Int. Cl.[5] B32B 3/10; C09J 5/02
U.S. Cl. 428—136 10 Claims



1. A method of constructing a connector block, said block including a plurality of chambers each for holding a contact member therein, comprising the steps of:

providing a plurality of metal plates, each of said plates being formed with a plurality of apertures so situated on said plates that when said plates are stacked the apertures form said plurality of chambers;

providing a solution of resin and catalyst in a solvent;

coating each of said plates with said solution;

allowing said solvent to evaporate from each of said plates to leave a film of resin and catalyst thereon;

stacking said plates; and

causing the resin and catalyst to cross-link and fuse;

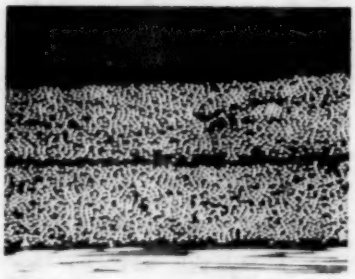
wherein the step of providing a solution of resin and catalyst in a solvent comprises choosing a ratio of resin and catalyst to solvent so that when said solvent evaporates from each of said plates there remains on each of said plates a continuous film of resin and catalyst approximately 0.0002 inch thick, so that said film does not fill any of said apertures in each of said plates.

4,957,801

ADVANCE COMPOSITES WITH THERMOPLASTIC PARTICLES AT THE INTERFACE BETWEEN LAYERS

Artun Maranci, Westport; Steven L. Peake, Ridgefield, and Stanley S. Kaminski, Stamford, all of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Filed May 17, 1989, Ser. No. 353,277
Int. Cl.[5] B32B 5/28, 5/30
U.S. Cl. 428—147 7 Claims



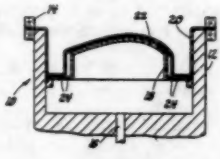
1. A fiber reinforced thermosetting resin matrix prepreg having an outer resin layer apart from the reinforcing fiber at one or both surfaces of the prepreg said outer layer comprising particles of thermoplastic resin of particle size in the range from 2 to 100 microns particle diameter.

4,957,802

ARTICLE COVERED WITH PAINTED CARRIER FILMS

Charles C. Mentzer; Howard W. Cox, both of Birmingham, and William T. Short, Southfield, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 162,731, Mar. 1, 1988, Pat. No. 4,838,973, which is a continuation-in-part of Ser. No. 881,344, Jul. 2, 1986, abandoned. This application Aug. 4, 1988, Ser. No. 228,082
The portion of the term of this patent subsequent to Sep. 19, 2006, has been disclaimed.
Int. Cl.[5] B32B 7/02, 27/40
U.S. Cl. 428—174 1 Claim



1. A paint coated article comprising:

a substrate portion having front and back surfaces wherein the front surface of said substrate portion being contoured to define the exterior surface of said article,

a facing sheet being stretched and disposed over the entire front surface of said substrate portion in a thermoforming process and contoured in detail in conformance with said contour of the front surface of said substrate portion,

said facing sheet being a laminate comprising a thermoplastic sheet at least 0.05 mm thick, at least one layer of a pigmented paint containing flakes, and at least one layer of

a clear coat having a total thickness of said entire clear coat of no less than 15 microns,

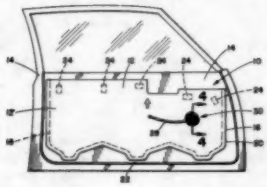
said clear coat layer serves to retain the gloss appearance of said facing sheet after stretching to a strain of at least 10% at a 20° gloss reading of no less than 50 as measured by a Gardner gloss meter.

4,957,803

WATER DEFLECTOR WITH WIRE HARNESS SEAL

Dennis D. Foley, Inverness, Fla., assignor to The Excello Specialty Company, Cleveland, Ohio

Filed Jul. 28, 1988, Ser. No. 225,239
Int. Cl.[5] B32B *3/28, 3/30, 31/18, 31/20*
U.S. Cl. 428—182 14 Claims



7. A protective deflector for application to a vehicle panel to prevent water or dust from entering the vehicle body while permitting a wire or the like to extend through said deflector comprising:

a flexible sheet of plastic material having a peripheral shape generally matching the peripheral configuration of at least some portion of a vehicle panel;

a laterally extending pocket in said sheet at a predetermined point corresponding to the point through which it is desired to extend said wire o the like;

a hole formed generally at the bottom of said pocket; and,

the interior of said pocket having adhesive therein for adhering the interior of said pocket to said wire o the like passed therethrough.

4,957,804

FIBROUS SUPPORT CUSHION

Kenneth L. Hendrix, Trinity, and Carl K. Rogers, High Point, both of N.C., assignors to Hendrix Batting Company, High Point, N.C.

Filed Oct. 14, 1988, Ser. No. 257,991
Int. Cl.[5] B32B *5/08, 5/26;* B68G *5/00*
U.S. Cl. 428—212 7 Claims

1. A support cushion comprising a plurality of layers of staple, polymeric batt laminated together, each of said layers comprising a combination of polyester fibers and sheath/core binder fibers bonded together in a substantially uncompressed state, said polyester fibers making up more than 50% of said batt, wherein said plurality of layers include a central layer comprising a combination of polyester fibers of a prescribed denier and sheath/core binder fibers bonded together, an uppermost and lowermost layer comprising a combination of slickened polyester fibers of a prescribed denier and sheath-/core binder fibers bonded together, and at least one intermediate layer between said central layer and each of said outermost layers comprising a combination of unslickened polyester fibers of a prescribed denier and sheath/core binder fibers bonded together.

4,957,805

METHOD OF MAKING LAMINATED REINFORCED THERMOPLASTIC SHEETS AND ARTICLES MADE THEREFROM

Ian S. Biggs, High Wycombe, and Bronislaw Radvan, Flackwell Heath, both of England, assignors to The Wiggins Teape Group Limited, Basingstoke, England

Continuation-in-part of Ser. No. 78,112, Jul. 27, 1987, abandoned. This application Jul. 11, 1988, Ser. No. 217,324
Claims priority, application United Kingdom, Jul. 31, 1986, 8618727
Int. Cl.[5] B32B *7/08*
U.S. Cl. 428—223 10 Claims

1. A method of making laminated reinforced thermoplastic sheets which includes preparing first and second unconsolidated porous sheets each comprising 20% to 60% by weight of reinforcing fibers having a high modulus of elasticity and 40% to 80% by weight of a thermoplastic material differing from the thermoplastic material in the other sheet, placing the sheets together so that projecting fibers from the adjacent sheets interengage in a boundary zone, and applying heat and pressure to cause the sheets to consolidate and adhere together to form a laminate in which the unconsolidated sheets are formed and dried together by making a first stock of reinforcing fibers and the first thermoplastic material in particulate form, depositing that first stock on the wire of a papermaking machine, partially draining that first stock, making a second stock of reinforcing fibers and the second thermoplastic material in particulate form, depositing that second stock on top of the partially drained first stock, draining the two stocks, and drying the two stocks together.

4,957,806

HEAT RESISTANT ACRYLIC BINDERS FOR NONWOVENS

Ronald Pangrazi, Flemington; James L. Walker, Whitehouse Station, and Paul R. Mudge, Belle Mead, all of N.J., assignors to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.

Filed Oct. 16, 1987, Ser. No. 109,651
Int. Cl.[5] B32B *1/08, 27/04, 27/08;* F24F *5/08*
U.S. Cl. 428—224 19 Claims

18. In a roofing membrane comprising a polyester mat impregnated with the dried resins of an emulsion polymer the impregnated mat being subsequently coated with asphalt, the improvement which comprises using, as the emulsion polymer, a polymer having a glass transition temperature (Tg) of +10 to +50° C., the polymer consisting essentially of 100 parts by weight of C_1–C_4 alkyl acrylate or methacrylate monomers or mixtures thereof, 0.5 to 5 parts of a hydroxyalkyl acrylate or methacrylate, 3 to 6 parts of a water soluble N-methylol containing comonomer and 0.1 to 5 parts of a multifunctional comonomer.

4,957,807

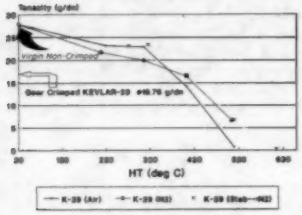
NONLINEAR AROMATIC POLYAMIDE FIBER OR FIBER ASSEMBLY

Francis P. McCullough, Jr., Lake Jackson, Tex.; Bhuvenesh C. Goswami, Clemson, S.C.; R. Vernon Snelgrove, Damon, Tex., and David M. Hall, Auburn, Ala., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 278,084, Nov. 30, 1988, abandoned, and a continuation-in-part of Ser. No. 278,081, Nov. 30, 1988. This application Nov. 21, 1989, Ser. No. 439,300
Int. Cl.[5] D02G *3/00*
U.S. Cl. 428—222 16 Claims

1. A non-carbonaceous heat set aromatic polyamide fiber having a substantially permanent non-linear configuration at

ambient temperatures with a reversible deflection ratio of greater than 1.2:1 at ambient temperatures, an aspect ratio of



greater than 10:1, and a bending strain value less than about 50%, said fiber being substantially free of V-type crimps.

4,957,808

THERMAL STENCIL PAPER FOR MIMEOGRAPH

Fumiaki Arai, Mishima, and Masaru Kimura, Hirakata, both of Japan, assignors to Ricoh Company, Ltd., Tokyo and General Company Ltd., Osaka, both of, Japan

Filed Sep. 9, 1988, Ser. No. 242,212
Claims priority, application Japan, Sep. 11, 1987, 62-228151
Int. Cl.[5] B32B *23/08, 27/10*
U.S. Cl. 428—262 **12 Claims**

1. A thermal stencil paper for use in a mineograph, comprising:

a laminate of a thermoplastic resin film on a porous support, with the surface of said film being provided with a layer consisting essentially of a graft polymer having branch polymer portions formed from a fluorocarbon or silicone resin prepared by copolymerizing a radically polymerizable polymer which forms the polymer branches of said graft copolymer with a radically polymerizable monomer which constitutes the backbone polymer component of said graft polymer, said radically polymerizable branched polymer component being prepared by modifying a terminal of a fluorocarbon or silicone prepolymer having a functional group at said terminus such that a radically polymerizable double bond is introduced into the polymer.

2. The thermal stencil paper of claim 1, wherein said porous support is a synthetic fiber paper, a woven or nonwoven fabric, or Japanese paper.

4,957,809

FIBER WEB FOR COMPRESSION MOLDING STRUCTURAL SUBSTRATES FOR PANELS

Alfred L. Davis, Thomson, Ga., assignor to Sheller-Globe Corporation, Toledo, Ohio

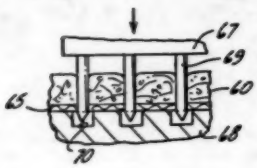
Division of Ser. No. 182,298, Dec. 15, 1987, Pat. No. 4,865,788, which is a continuation of Ser. No. 882,688, Jul. 7, 1986, Pat. No. 4,473,236, which is a division of Ser. No. 803,282, Dec. 2, 1985, Pat. No. 4,612,224. This application Jul. 14, 1989, Ser. No. 379,983
The portion of the term of this patent subsequent to Mar. 29, 2005, has been disclaimed.
Int. Cl.[5] B32B *5/16*
U.S. Cl. 428—283 **5 Claims**

1. A fiber web for use in compression molding a panel structural substrate, comprising:

a relatively wide and thick mat formed of randomly disposed, non-woven fibers which are thoroughly intermixed;

an uncured molding plastic resin in powder form substantially uniformly dispersed ans mixed within the fibers forming the mat;

and said fibers being mechanically interlocked by needling; wherein the web may be cut to predetermined sizes and shapes for compression molding, under heat and pressure,



within close cavity molds to form stiff substrates for panels.

4,957,810

SYNTHETIC SPONGE-TYPE ARTICLES HAVING EXCELLENT WATER RETENTION

Bernard Eleouet; Michel Ramage, and Gilles Rongier, all of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 24, 1989, Ser. No. 342,176
Int. Cl.[5] B32B *3/26*
U.S. Cl. 428—306.6 **6 Claims**

1. Synthetic sponge-type articles having excellent water retention properties, comprising a flexible, partially open celled foam body made of hydrophobic synthetic material, at least partially covering the cell walls of said foam body with a layer of hydrophilic absorbent material, wherein the foam body has a specific surface at least equal to about 40 cm^2/cm^3, and at least about 25% of its internal and external surface has an energy surface at least equal to about 73 x 10−7 Newton/meter.

4,957,811

COMPONENTS OF SILICON-INFILTRATED SILICON CARBIDE HAVING A POROUS SURFACE, AND PROCESS FOR THE PRODUCTION THEREOF

Werner Benker, Selb; Gert Lindemann, Lichtenstein, and Jürgen Heinrich, Selb, all of Fed. Rep. of Germany, assignors to Hoechst CeramTec Aktiengesellschaft, Selb, Fed. Rep. of Germany

Filed Sep. 26, 1989, Ser. No. 415,560
Claims priority, application Fed. Rep. of Germany, Sep. 28, 1988, 3832876
Int. Cl.[5] B32B *9/00, 5/14;* C01B *31/36*
U.S. Cl. 428—312.6 **8 Claims**

5. A component of silicon-infiltrated silicon carbide, having a porous sliding surface, which is composed of

40–95% by weight of silicon carbide,

1–45% by weight of carbon particles of a grain size between 0.1 and 500 μm and

1–25% by weight of silicon,

at least 80% of the silicon carbide present being in the form of primary silicon carbide having grain sizes of 1 to 100 μm.

4,957,812
COMPOSITE MAGNETIC POWDER, METHOD FOR PRODUCING THE SAME AND RECORDING MEDIUM CONTAINING THE SAME

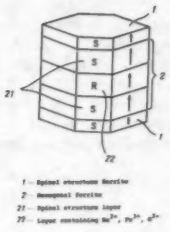
Nobuyuki Aoki, Hirakata; Masaki Aoki, Minou; Hideo Torii, Higashiosaka; Keiichi Ochiai, Hirakata, and Eiji Fujii, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 13, 1987, Ser. No. 107,454

Claims priority, application Japan, Oct. 13, 1986, 61-242425; Dec. 1, 1986, 61-286328; May 7, 1987, 62-111029

Int. Cl.[5] G11B *23/00*

U.S. Cl. 428—329 **2 Claims**



1 — Spinel structure ferrite
2 — Hexagonal ferrite
21 — Spinel structure layer
22 — Layer containing Ba^{2+}, Fe^{3+}, O^{2-}

1. A magnetic recording medium formed by coating a composite type magnetic powder, each particle of which comprises a hexagonal ferrite and a spinel structure ferrite on a non-magnetic support together with a resin binder, wherein the hexagonal ferrite has a magnetoplumbite structure having the chemical formula $MO.nFe_2O_3$ in which M is one or more metal elements selected from the group consisting of Ba, Sr, Pb and Ca and n is 5 to 6, the c(001)-plane of the hexagonal ferrite being crystallographically grown, and wherein the (111) plane of the spinel structure ferrite is crystallographically grown on the crystallographically grown C-plane of the hexagonal ferrite so that the hexagonal ferrite and the spinel structure ferrite are in a crystallographically epitaxial relation.

4,957,813
PRESSURE-SENSITIVE TRANSFER MEMBER

Hirohide Matsuhisa, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 7, 1988, Ser. No. 241,207

Claims priority, application Japan, Sep. 8, 1987, 62-222973

Int. Cl.[5] B41M *5/03*

U.S. Cl. 428—336 **6 Claims**

1. A pressure-sensitive transfer member having an ink layer comprising a pressure-sensitive transferable ink composition containing colorant material, an oil component and a resin component provided on a substrate, characterized in that the respective solubility parameters δ_O, δ_B of the oil and the resin satisfy the following relationship:

$$\delta_B - 1.30 < \delta_O < \delta_B - 0.80.$$

4,957,814
POWDER COATING COMPOSITIONS

Robert B. Barbee, and Brian S. Phillips, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 21, 1989, Ser. No. 341,171

Int. Cl.[5] B32B *5/16, 15/08, 27/36*

U.S. Cl. 428—402 **17 Claims**

1. A thermosetting coating composition in the form of a powder having an average particle size of about 10 to 300 microns comprising:

(1) a polyester having a glass transition temperature of at least 50° C., a hydroxyl number of about 20 to 200, an acid number of 0 to about 15 and an inherent viscosity of about 0.1 to 0.5 comprised of:

(a) diacid residues comprising at least 50 mole percent terephthalic acid residues; and

(b) diol residues comprising at least 90 mole percent of 2,2-dimethyl-,1,3-propanediol and 1,4-bis(2-hydroxyethoxy)benzene residues wherein the mole ratio of 2,2-dimethyl-1,3-propanediol residues to 1,4-bis(2-hydroxyethoxy)benzene residues is about 4:1 to 0.7:1; and

(2) a cross-linking effective amount of a blocked polyisocyanate compound.

4,957,815
POLYARYLALKANE OLIGOMER COMPOSITIONS CONTAINING XYLENE UNITS, PROCESS FOR THEIR MANUFACTURE, AND PRODUCTS CONTAINING THE SAME

Raymond Commandeur, Vizile, and Bernard Gurtner, Grenoble, both of France, assignors to Societe Atochem

Filed Jul. 1, 1988, Ser. No. 214,286

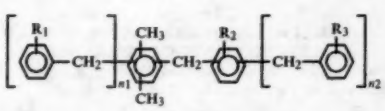
Claims priority, application France, Jul. 16, 1987, 87 10068

Int. Cl.[5] B01J *13/02*; C07C *2/03, 15/08, 15/12*

U.S. Cl. 428—402.2 **5 Claims**

1. A polyarylalkane oligomer composition consisting essentially of a mixture of at least one oligomer A and at least one oligomer B, wherein:

(a) the oligomer A is a mixture of isomers of formula:



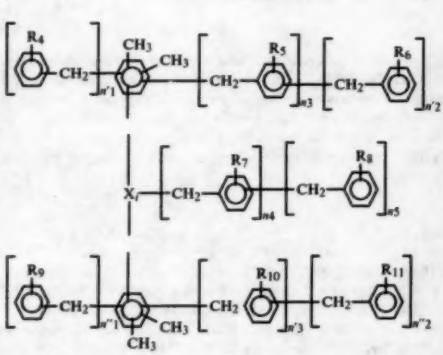
in which:

R_1, R_2 and R_3 are identical or different and selected from H or CH_3, and

n_1 and n_2 each $=0$, 1 and 2, and $n_1+n_2 \leq 3$;

each of the isomers A having the same or different substituents R_1, R_2 and R_3; and

(b) the oligomer B is a mixture of isomers of formula:



in which:

R_4, R_5, R_6, R_7, R_8, R_9, R_{10} and R_{11} are identical or different and selected from H or CH_3,

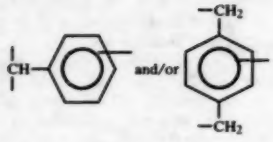
n'_1, n''_1 and n_4 each $=0$, 1 or 2,

n'_2, n''_2, n_3, n''_3 and n_5 each $=0$ or 1,

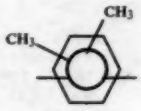
$n'_1+n''_1+n''_2+n''_2+n_3+n''_3+n_4+n_5 \leq 2$,

i has the value of 1 or 2,

X_i is a trivalent connecting group such as



and in which the connections towards the groups



are provided by carbon atoms not forming part of the phenyl group of X_1;

each of the isomers B having the same or different substituents R_4 to R_{11}.

5. Microcapsules comprising an outer rupturable encapsulating material and encapsulated therein a color-forming material and a solvent therefor, said solvent being the composition position of any one of claims 1 to 4.

4,957,816

POLYMERIC SUBSTRATE COATED WITH AN ELECTROCONDUCTIVE LAYER

Kelvin P. Adkins, Elmstead Market, England, assignor to Imperial Chemical Industries PLC, London, England

Division of Ser. No. 69,701, Jun. 30, 1987, Pat. No. 4,879,064. This application Aug. 30, 1989, Ser. No. 400,794

Claims priority, application United Kingdom, Jul. 2, 1986, 8616186

Int. Cl.[5] B32B *27/38, 27/36, 27/28*

U.S. Cl. 428—411.1 **4 Claims**

1. A coated article comprising a polymeric substrate having, on at least one surface thereof, an electroconductive layer of a composition, wherein the composition comprises a polymeric electrolyte and a polyepoxy resin in a weight ratio from 1:20 to 1:0.5, the polymeric electrolyte being a cationic electroconductive polymer capable of conducting a current through ionization.

4,957,817

FILM, FIBER, AND MICROPOROUS MEMBRANES OF POLY(ETHERETHERKETONE)DISSOLVED IN HIGH BOILING POINT POLAR ORGANIC SOLVENTS

Chieh-Chun Chau, Midland, Mich., and Ritchie A. Wessling, Berkeley, Calif., assignors to The Dow Chemical, Midland, Mich.

Filed Nov. 25, 1988, Ser. No. 276,006

Int. Cl.[5] C08J *9/28*

U.S. Cl. 428—436 **19 Claims**

1. A method of manufacture of a film of poly(oxy-1,4-phenyleneoxy-1,4-phenylene-carbonyl-1,4-phenylene) (PEEK) comprising dissolving solid PEEK in an organic polar solvent having a boiling point in a range from 141° C. to 380° C., then casting the PEEK solution on a smooth surface.

4,957,818

MOLDED SYNTHETIC RESIN PRODUCT

Atsushi Obayashi; Yuji Takeda, and Kazuya Kinoshita, all of Nagoya, Japan, assignors to Mitsubishi Kasei Vinyl Company, Tokyo, Japan

Filed Aug. 8, 1988, Ser. No. 229,424

Claims priority, application Japan, Aug. 14, 1987, 62-202790; Oct. 8, 1987, 62-253965; Jan. 19, 1988, 63-9386; Mar. 28, 1988, 63-73512; Mar. 28, 1988, 63-73513

Int. Cl.[5] B32B *7/02, 27/30;* **C08J** *7/04*

U.S. Cl. 428—451 **6 Claims**

1. A molded synthetic resin product comprising a synthetic resin substrate and a coating layer formed by heat treatment of a coating composition on the surface of the substrate, said coating composition comprising (A) a silane compound having a hydrolyzable group directly bonded to a silicon atom, and (B) an acrylic resin obtained by polymerizing a monomer selected from the group consisting of alkyl (meth)acrylates, or a mixture of such a monomer with an alkenyl benzene monomer, and a copolymerizable α,β-ethylenically unsaturated monomer, wherein the ratio by weight of the silane compound (A) to the acrylic resin (B) is within a range of from 20:1 to 1:15.

4,957,819

FRAMELESS AND CORELESS POROUS ENDOSSEOUS IMPLANT

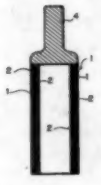
Haruyuki Kawahara, Osaka; Seiichi Tsukamoto, Kanagawa; Yutaka Nomura, Kanagawa; Katsumi Tanaka, Kanagawa; Yasuyuki Ashiura, Kanagawa, and Motonobu Yoshimura, Kanagawa, all of Japan, assignors to Haruyuki Kawahara, Osaka and Toho Titanium Co., Ltd., Tokyo, both of, Japan

Filed May 30, 1989, Ser. No. 358,828

Claims priority, application Japan, Jun. 10, 1988, 63-144466

Int. Cl.[5] G22F *3/00*

U.S. Cl. 428—547 **6 Claims**



1. A frameless and coreless porous endosseous implant comprising a porous sintered metal layer (2) having a range of relatively large pores and porous sintered metal layers (1) and (1) each having a range of relatively small pores and laminated into one body by sintering integrally with the layer (2) of relatively large pores on either side thereof, whereby said three layers (1), (2), and (1) each permit the ingrowth and penetration of two or more kinds of tissue selected from the group consisting of fibrous tissue, osteoid tissue and bone tissue in the pores thereof, said large pores having a mean size range of of 50–200 μm.

4,957,820

LAMINATED METAL SHEET

Peter J. Heyes, Wantage, and Nicholas J. Middleton, Highworth, both of England, assignors to CMB Foodcan plc, Worcester, England

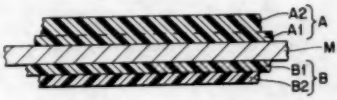
PCT No. PCT/GB88/00851, § 371 Date Jun. 9, 1989, § 102(e) Date Jun. 9, 1989, PCT Pub. No. WO89/03302, PCT Pub. Date Apr. 20, 1989

PCT Filed Oct. 12, 1988, Ser. No. 378,214

Claims priority, application United Kingdom, Oct. 15, 1987, 8724237

Int. Cl.[5] B28C *35/02;* B32B *15/08*

U.S. Cl. 428—623 46 Claims



46. A container or a component for a container produced from a polymer/metal/polymer laminate comprising a metal sheet having a polymer film adhered to each of its major surfaces, the polymer films having been adhered to the metal sheet by simultaneous thermal lamination, the polymer film adhered to one major surface of the metal sheet being a composite polyester film (a) comprising an inner layer (A1) of a substantially non-crystalline linear polyester having a softening point below 150° C. and a melting point above 150° C. but below 240° C. and an outer layer (A2) of a linear polyester having a melting point above 220° C., and the polymer film adhered to the other major surface of the metal sheet being a polyolefin-containing film (B) comprising a bonding resin which is an acid modified polyolefin resin containing carboxyl or anhydride groups.

4,957,821

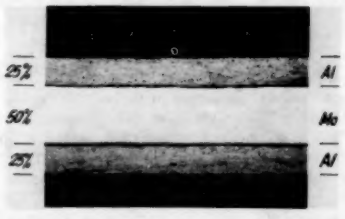
COMPOSITE ALUMINUM MOLYDENUM SHEET

Richard D. Nicholson, Chardon, and Sandeep Jain, Mentor, both of Ohio, assignors to AMAX Inc., New York, N.Y.

Filed May 30, 1989, Ser. No. 357,836

Int. Cl.[5] B32B *15/01*

U.S. Cl. 428—651 4 Claims



1. A roll-bonded composite sheet product having a core layer of molybdenum and layers of aluminum on each face of said molybdenum, with the interface between said molybdenum and said aluminum being sharply defined and with no detectable diffusion occurring across said interface.

4,957,822

LAMINATED MATERIAL FOR FRICTION BEARING ELEMENTS, COMPRISING AN ANTIFRICTION LAYER OF AN ALUMINUM BASED BEARING MATERIAL

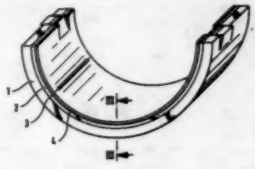
Michael Steeg, Ober-Olm; Peter Neuhaus, Hochheim/Main; Albert Roth, Frankfurt am Main, and Ulrich Engel, Bad Schwalbach, all of Fed. Rep. of Germany, assignors to Glyco-Metall-Werke Daelen & Loos GmbH, Wiesbaden, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 303,926, Jan. 30, 1989, which is a continuation-in-part of Ser. No. 124,617, Nov. 24, 1987, abandoned. This application Feb. 7, 1990, Ser. No. 476,522

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1986, 3640328; Sep. 3, 1987, 3729414

Int. Cl.[5] B32B *15/00, 15/10;* F16C *33/06*

U.S. Cl. 428—653 17 Claims



1. A laminate for use in forming a friction bearing constituted of a steel support layer and an anti-friction aluminum alloy layer carried by the support layer, said aluminum alloy layer having nickel in the amount of from 1% to 3% by weight and manganese in the amount of from 0.1% to 2.5% by weight, characterized in that said aluminum alloy comprises hard particles selected from the group consisting of nickel, manganese, aluminum-nickel alloy, aluminum-manganese alloy, and aluminum-nickel-manganese alloy, said hard particles being present essentially in the amount of 20-30% by weight.

4,957,823

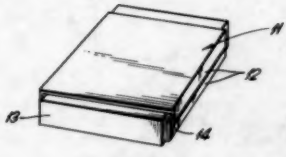
COMPOSITE SHEET MADE OF MOLYBDENUM AND DISPERSION-STRENGTHENED COPPER

Richard D. Nicholson, Chardon, and Ronald S. Fusco, Mentor, both of Ohio, assignors to AMAX Inc., New York, N.Y.

Filed May 30, 1989, Ser. No. 357,835

Int. Cl.[5] B32B *15/01*

U.S. Cl. 428—663 5 Claims



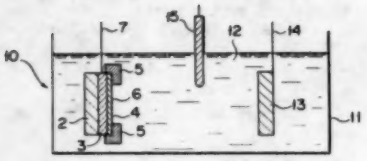
1. A roll-bonded composite sheet product having at least one layer of dispersion-strengthened copper and at least one layer of molybdenum, said composite being characterized by a sharply defined, cleavage-resistant interface between said copper and said molybdenum with substantially no detectable diffusion of one metal into the other across said interface, said composite being resistant to delamination and being capable of maintaining structural integrity upon repeated high temperature firings at temperatures up to 900° C.

4,957,824

INFORMATION STORAGE MEDIUM AND METHOD OF MANUFACTURING THE SAME

Hideki Ohkawa, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 18, 1988, Ser. No. 169,982
Claims priority, application Japan, Mar. 24, 1987, 62-69506; May 18, 1987, 62-120660
Int. Cl.[5] G11B 11/00
U.S. Cl. 428—694 21 Claims



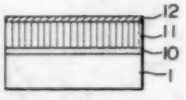
1. An information storage medium comprising:
a substrate; and
a magneto-optical recording layer, provided on the substrate, having an axis of easy magnetization perpendicular to a surface of said recording layer and containing a rare earth-transition metal amorphous magnetic alloy,
said recording layer including a hydrogen-containing portion at its surface formed by means of a hydrogenation reaction at a surface portion of said recording layer and having a coercive force different from that of other portions of the recording layer.

4,957,825

MAGNETIC RECORDING MEDIUM AND PROCESS FOR PRODUCING THE SAME

Masaaki Futamoto, Kanagawa; Yukio Honda, Fuchu; Selichi Asada, Kyoto; Takashi Nishimura, Kokubunji; Kazuetsu Yoshida, Kodaira, and Heigo Ishihara, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Maxell, Ltd., Osaka, both of, Japan

Continuation of Ser. No. 789,824, Oct. 21, 1985, abandoned.
This application Jan. 27, 1988, Ser. No. 149,142
Claims priority, application Japan, Oct. 22, 1984, 59-221688; Mar. 20, 1985, 60-54419
Int. Cl.[5] G11B 5/66, 11/00; B32B 9/00; G11C 13/06
U.S. Cl. 428—694 37 Claims



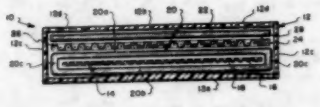
1. A magnetic recording medium comprising a substrate, a ferromagnetic thin film formed on substrate, a protective film formed directly on the ferromagnetic thin film, and a lubricant layer made of an organic material on said protective film, said ferromagnetic thin film and said protective film being formed continuously without exposing said ferromagnetic thin film and said protective film to air and while maintaining said ferromagnetic thin film and said protective film in a vacuum, said protective film having two layers, the first layer being made of the element Si, Ge or B, a compound of Si, Ge or B, or an alloy principally made of Si, Ge, or B and the second layer being made of the element Sn, Pb, In, Se, Te, Cu, Ag or Au, a Sn-based alloy, a Pb-based alloy, an In-based alloy, a Se-based alloy, a Te-based alloy, a Cu-based alloy, an Ag-based alloy or an Au-based alloy.

4,957,826

RECHARGEABLE METAL-AIR BATTERY

Michael C. Cheiky, Santa Barbara, Calif., assignor to Dreisbach Electromotive, Inc., Santa Barbara, Calif.

Filed Apr. 25, 1989, Ser. No. 343,193
Int. Cl.[5] H01M 12/06
U.S. Cl. 429—27 30 Claims



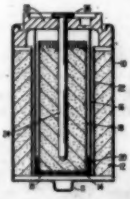
1. A rechargeable metal-air battery, comprising:
metal anode means;
porous anode separator means for retaining liquid electrolyte having first and second layers which sandwich the anode means therebetween and at least one edge which interconnects the first and second layers and said separator means extends in a continuous wrap around the anode means;
air cathode means; and
a liquid electrolyte completely entrained in the porous anode separator means.

4,957,827

RECHARGEABLE ALKALINE MANGANESE CELLS WITH ZINC ANODES

Karl Kordesch; Josef Gsellmann, both of Graz, Austria, and Klaus Tomantschger, Mississauga, Canada, assignors to Battery Technologies Inc., Mississauga, Canada

Filed Aug. 22, 1988, Ser. No. 234,926
Claims priority, application Canada, Jul. 8, 1988, 571629
Int. Cl.[5] H01M 10/24
U.S. Cl. 429—60 11 Claims



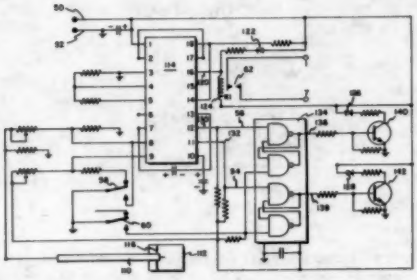
1. A rechargeable, alkaline, electrochemical cell comprising:
a rechargeable manganese dioxide cathode mixed with graphite or other conductive carbon, agglomerated with a binder and contained by a metallic screen serving as an oxygen evolution catalyst carrier, and serving also to provide restrictive force against cathode expansion;
a powdered zinc anode contained in a metallic basket;
a separator between the cathode and the anode; and
an alkaline electrolyte contacting the cathode and the anode through the screen, the basket and the separator;
where said metallic basket is located at the inside of said separator, and said metallic screen is located at the outside of said separator and at the inside of said cathode.

4,957,828

EMERGENCY BATTERY MONITOR

Stephen A. Garron, Elizabeth, N.J., assignor to SSMC Inc, Edison, N.J.

Filed Dec. 9, 1988, Ser. No. 281,609
Int. Cl.[5] H01M *10/48*
U.S. Cl. 429—92 6 Claims



1. An emergency battery monitor adapted for use with at least one storage battery, the battery having first and second output terminals across which an output voltage is produced, the battery, when in normal operation, exhibiting an output voltage falling within a nominal value range having maximum and minimum values, the battery having at least one cell which contains a liquid electrolyte, the electrolyte, when the battery is in normal operation, having minimum level in the cell, said monitor comprising:

first means associated with the cell, the first means being electrically conductive when the level of the electrolyte is at least equal to the minimum level and being electrically non-conductive when the level of the electrolyte falls below the minimum level; and

second means coupled to the output terminals and the first means to produce a first signal designating normal battery operation when the first means is conductive and the value of the output voltage falls within the nominal value range, the second means producing a second signal designating abnormal battery operation when the value of the output signal falls below the minimum value, and/or the first means is non-conductive, the second means producing a third signal designating abnormal battery operation when the value of the output signal exceeds the maximum value.

4,957,829

MODULAR BATTERY PLANT SYSTEM ASSEMBLY COMPRISING MULTIPLE UNIT CELL MODULES

Joel T. Holl, Parsippany, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 26, 1989, Ser. No. 371,368
Int. Cl.[5] H01M *2/10*
U.S. Cl. 429—99 11 Claims

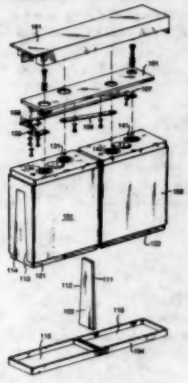
1. A battery plant system, comprising:

a plurality of unit battery cells, each unit cell including: positive and negative terminals and having keyed accepting detents in opposing sides of each unit cell, an interlocking mechanism engaging keyed accepting detents of adjacent unit battery cells for serially joining the unit battery cells into a battery cell assembly module,

a base support for supporting the unit battery cells interlocked into a battery cell assembly module, at least first and second assembly busses for electrically joining electrical terminals of the unit battery cells and including output terminals included in the busses located at an exposed end of the battery cell assembly module to form the positive and negative output terminals of the battery cell assembly module,

a supporting receptacle for holding a single stratum of a plurality of battery cell assembly modules,

a frame work for accepting mounting of the supporting receptacles in vertical tiers and a plurality of plant busses



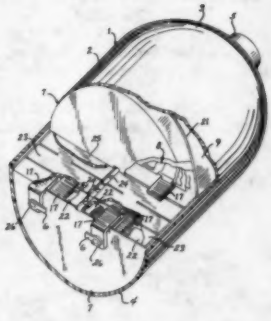
connected for electrically joining the output terminals included in the assembly busses to form a battery plant.

4,957,830

RECHARGEABLE METAL OXIDE-HYDROGEN BATTERY

Kenneth R. Jones, Oconomowoc, Wis., assignor to Globe-Union Inc., Milwaukee, Wis.

Filed Apr. 7, 1989, Ser. No. 334,361
Int. Cl.[5] H01M *12/08*
U.S. Cl. 429—101 26 Claims



1. A rechargeable metal oxide-hydrogen battery, comprising an outer generally cylindrical pressure vessel, a plurality of cell modules disposed within the vessel, each module comprising a pair of back-to-back positive electrodes, a first separating layer disposed between said positive electrodes, a negative electrode disposed adjacent each positive electrode, a second separator layer disposed between each negative electrode and the adjacent positive electrode, an electrolyte impregnated within said separator layers and in contact with said electrodes, each module being generally semi-circular in planar configuration and including a semi-circular peripheral edge disposed adjacent the inner surface of said vessel and a generally diametral edge connecting opposite ends of said semi-circular edge, and connecting means for connecting said electrodes in an external electrical circuit.

4,957,831

CONTROL APPARATUS FOR SWITCHING A BATTERY PACK

Daryl S. Meredith, Cockeysville, and Scott D. Price, Pylesville, both of Md., assignors to Black & Decker, Inc., Newark, Del.

Continuation of Ser. No. 164,436, Mar. 4, 1988, abandoned. This application Dec. 15, 1988, Ser. No. 285,296

Int. Cl.[5] H01M 2/00

U.S. Cl. 429—121 8 Claims

1. A control apparatus for rendering operable a selected one of two power receptacles, the receptacles being coupled to an electric circuit that includes a switch for selectively delivering power to the receptacles, comprising:

means for retaining the receptacles a predetermined distance apart;

a cover moveable on said retaining means along a line intersecting both of said power receptacles so as to selectively expose the selected one of the two power receptacles while simultaneously covering the nonselected one of the receptacles; and

means, coupling said cover to the switch, for translating the movement of said cover into operable movement of the switch.

4,957,832

PLASTIC SEALING ELEMENT FOR A GALVANIC PRIMARY CELL

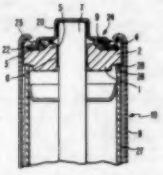
Klaus Ruggeberg, Ellwangen, and Horst-Udo Jose, Fichtenau-Unterdeufstetten, both of Fed. Rep. of Germany, assignors to Varta Batterie Aktiengesellschaft, Hanover, Fed. Rep. of Germany

Filed Nov. 14, 1988, Ser. No. 271,021

Claims priority, application Fed. Rep. of Germany, Dec. 11, 1987, 3742026

Int. Cl.[5] H01M 2/04, 2/08

U.S. Cl. 429—164 26 Claims



1. A plastic sealing element for a galvanic primary element in the form of a round cell including a metal casing, a metal housing cover and a carbon rod conductor, comprising a radially symmetrical plastic body, the upper surface of which defines a circumferential trough-shaped depression bounded by a raised rim, said raised rim including a circumferential projection for receiving edge portions of the metal housing cover and an elastomeric plastic material formed as a continuous annular bead on the trough-shaped depression.

4,957,833

NON-AQUEOUS LIQUID ELECTROLYTE CELL

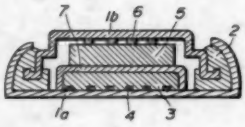
Hideharu Daifuku, Akishima; Takashi Kitamura, Hachiohji, and Takahiro Kawagoe, Tokorozawa, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Dec. 5, 1989, Ser. No. 446,424

Claims priority, application Japan, Dec. 23, 1988, 63-327355; Dec. 23, 1988, 63-327356

Int. Cl.[5] H01M 6/14

U.S. Cl. 429—197 9 Claims



1. A non-aqueous liquid electrolyte cell comprising

a positive electrode having an electroconductive organic polymer as a positive electrode active material,

a negative electrode having lithium or a lithium alloy as a negative electrode active material, and

a non-aqueous electrolyte solution containing an electrolyte in a non-aqueous solvent mixture of a non-cyclic carbonate and a cyclic carbonate.

4,957,834

METHOD FOR MANUFACTURING PHOTOMASK

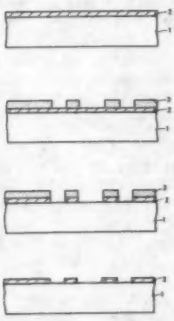
Shuichi Matsuda, and Yaichiro Watakabe, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 3, 1988, Ser. No. 266,706

Claims priority, application Japan, Dec. 22, 1987, 62-324417

Int. Cl.[5] G03F 1/00

U.S. Cl. 430—5 12 Claims



1. A method for manufacturing a photomask, comprising

providing a transparent glass substrate, said substrate being provided with a main surface;

forming on the main surface of the substrate a refractory metal silicide film, said silicide film having a main surface opposite the side where the silicide film contacts the main surface of the substrate;

forming resistant films on the main surface of the silicide film, said resistant films being formed at a predetermined distance from one another to expose portions of the main surface of the silicide film; and

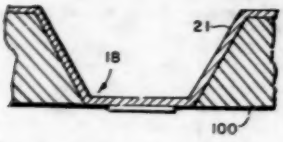
plasma etching the exposed portions of the main surface of the metal silicide film in a gas mixture containing at least nitrogen gas and CF_4 gas.

4,957,835

MASKED ELECTRON BEAM LITHOGRAPHY

Gary D. Aden, Redwood City, Calif., assignor to Kevex Corporation, Foster City, Calif.

Filed May 15, 1987, Ser. No. 49,839
Int. Cl.[5] G03F 1/00
U.S. Cl. 430—5 5 Claims



1. In a method for making a mask for flood beam electron lithography wherein the flood beam is patterned by passing through the mask and thence into the photoresist for exposure thereof, the steps of:

recessing a substrate from one side to define a recess having a frame portion closed by a bottom end wall portion of the substrate;

forming a relatively thin membrane layer of electron permeable material overlaying the bottom end wall of the recess;

removing the end wall material overlaying said relatively thin membrane layer of electron permeable material; and

forming a patterned layer of electron absorber material overlaying said membrane layer of electron permeable material to define the electron mask.

4,957,836

ELECTROPHOTORECEPTOR USING HYDRAZONE AS THE CHARGE TRANSPORT MATERIAL

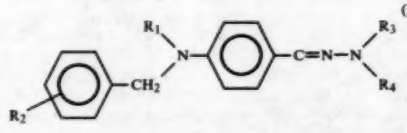
Tai J. Chen, Hsinchu, Taiwan, assignor to Industrial Technology Research Institute, Chutung, Hsinchu, Taiwan

Filed May 25, 1989, Ser. No. 357,370
Int. Cl.[5] G03G 5/14
U.S. Cl. 430—59 13 Claims

1. An electrophotoreceptor comprising the components of:

an electrically conductive substrate; a charge generation layer comprising a charge generation material capable of generating electron-hole pair upon exposure under a selected light; and

a charge transport layer comprising a polymeric binder and a hydrazone compound of formula (I)


(I)

in which R^1 represents substituted or unsubstituted C_1–C_4 alkyl, R_2 represents hydrogen, alkyl or alkoxy, R_3 and R_4 and independently represent substituted or unsubstituted alkyl group substituted or unsubstituted aryl group or substituted or Unsubstituted aralkyl group, or together with the bonded nitrogen atom represent substituted or unsubstituted aromatic heterocyclic ring.

4,957,837

PHOTOSENSITIVE MEMBER FOR ELECTROPHOTOGRAPHY CONTAINING HYDRAZONE IN CHARGE TRANSPORT LAYER

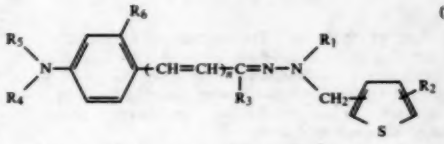
Masami Kuroda; Youichi Nakamura, and Noboru Furusho, all of Kanagawa, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

Filed Oct. 13, 1988, Ser. No. 257,260
Claims priority, application Japan, Oct. 15, 1987, 62-260531; Oct. 20, 1987, 62-265112; Oct. 20, 1987, 62-265113; Oct. 21, 1987, 62-265751; Oct. 21, 1987, 62-265752
Int. Cl.[5] G03G 5/06
U.S. Cl. 430—59 18 Claims

1. A photosensitive member for electrophotography comprising:

a substrate; and

a photosensitive layer formed on said substrate and including a charge generating substance and at least one hydrazone compound as a charge transporting substance represented by the following general formula (I):


(I)

wherein R_1 stands for an aryl group which may have at least one substituent; each of R_2, R_3, R_4, R_5, R_6 stands for a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group, a hydroxy group, a nitro group, an allyl group, an aryl group which may have at least one substituent, or an aralkyl group; and n stands for an integer of 0 or 1.

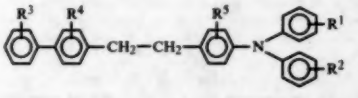
4,957,838

ELECTROPHOTOGRAPHIC PHOTOCONDUCTOR AND TRIPHENYLAMINE COMPOUNDS FOR USE IN THE SAME

Tamotsu Aruga, Mishima; Masaomi Sasaki, Susono, and Tomoyuki Shimada, Numazu, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Sep. 29, 1989, Ser. No. 414,480
Claims priority, application Japan, Sep. 30, 1988, 63-247036; Sep. 30, 1988, 63-247039
Int. Cl.[5] G03G 5/06
U.S. Cl. 430—59 20 Claims

1. An electrophotographic photoconductor comprising an electroconductive support and a photoconductive layer formed thereon comprising as an effective component at least one triphenylamine compound represented by formula (I):


(I)

wherein R^1, R^2, R^3, R^4 and R^5 each represent hydrogen, an alkyl group having 1 to 4 carbon atoms, an alkoxyl group having 1 to 4 carbon atoms, or a halogen, which may be the same or different.

4,957,839

ELECTROPHOTOGRAPHIC PHOTOCONDUCTOR HAVING A SILICONE RESIN CHARGE RETENTION LAYER

Takashi Rokutanzono, Numazu; Yukio Ide, Mishima; Hiroshi Nagame, Numazu; Kouichi Ohshima, Mishima; Narihito Kojima, and Shinji Nosbo, both of Numazu, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 198,865, May 26, 1988, abandoned. This application Nov. 21, 1988, Ser. No. 274,352

Claims priority, application Japan, May 26, 1987, 62-126941; Nov. 18, 1987, 62-292680; Nov. 20, 1987, 62-291831

Int. Cl.[5] G03G *5/10*

U.S. Cl. 430—66 **11 Claims**

11. The electrophotographic photoconductor as claimed in claim **10**, wherein said conductivity control agent is finely-divided tin oxide particles.

4,957,840

DEVELOPER AND IMAGE FORMING DEVICE

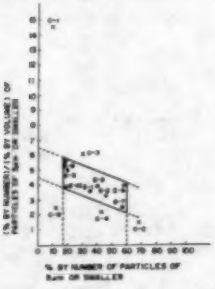
Kiichiro Sakashita, Inagi; Toshiaki Nakahara, Tokyo; Hirohide Tanikawa, Yokohama; Naoki Matsushige; Satoshi Yoshida, both of Kawasaki; Masatsugu Fujiwara, and Yasuo Mitsuhashi, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 25, 1988, Ser. No. 261,987

Claims priority, application Japan, Oct. 26, 1987, 62-271119

Int. Cl.[5] G03G *9/14*

U.S. Cl. 430—106.6 **22 Claims**



1. A developer for developing electrostatic images, comprising a magnetic toner comprising a binder resin and magnetic powder, said developer containing 17–60% by number of magnetic toner particles having a particle size of 5 microns or smaller, containing 1–23% by number of magnetic toner particles having a particle size of 8–12.7 microns, and containing 2.0% by volume or less of magnetic toner particles having a particle size of 16 microns or larger;

wherein the magnetic toner has a volume-average particle size of 4–9 microns, and the magnetic toner particles having a particle size of 5 microns or smaller have a particle size distribution satisfying the following formula:

$$N/V = -0.04N + k,$$

wherein N denotes the percentage by number of magnetic toner particles having a particle size of 5 microns or smaller, V denotes the percentage by volume of magnetic toner particles having a particle size of 5 microns or smaller, k denotes a positive number of 4.5–6.5, and N denotes a positive number of 17–60.

4,957,841

SPECIFICALLY INFLUENCING THE TRIBOELECTRIC EFFECT OF AZO PIGMENTS

Hans-Tobias Macholdt, Darmstadt; Alexander Sieber; Franz Schui, both of Frankfurt am Main, and Reinhold Deubel, Bad Soden am Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

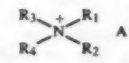
Filed Sep. 14, 1989, Ser. No. 407,225

Claims priority, application Fed. Rep. of Germany, Sep. 15, 1988, 3831384

Int. Cl.[5] G03G *9/00, 5/00*; C08K *5/00*; C09K *00/00*

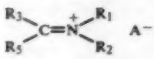
U.S. Cl. 430—110 **7 Claims**

1. A process for specifically influencing the triboelectric effect of azo pigments in electrophotographic toners or developers or in powders for surface coating, which comprises adding to the azo pigments at the coupling reaction stage, at the laking stage or in the course of finishing at least one saltlike cationic compound of the general formulae



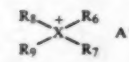
(1)

and/or



(2)

and/or



(3)

wherein in the case of the general formulae (1) and (2), R_1, R_2, R_3 and R_4 are independently of one another straight-chain or branched alkyl groups of 1 to 30 carbon atoms, oxyethyl groups of the general formula $-(CH_2-CH_2-O)_n-R$, wherein R is a hydrogen atom or an alkyl(C_1–C_4) or an acyl group and n is a number from 1 to 10, monocyclic or polycyclic cycloaliphatic radicals of 5 to 12 carbon atoms, monocyclic or polycyclic aromatic or araliphatic radicals, which aliphatic, araliphatic and aromatic radicals may be substituted by hydroxyl, alkoxy(C_1–C_4)—, primary, secondary or tertiary amino groups, acid amine groups or fluorine, chlorine or bromine atoms, R_5 is a hydrogen, fluorine, chlorine or bromine atom or an alkyl (C_1–C_6)—, alkoxy (C_1–C_6)— or primary amino group and A^- is one equivalent of an anion, and where R_1 and R_3 can be part of a ring system of 5 to 7 carbon atoms which may be interrupted by 1 or 2 heteroatoms and may contain 1 to 3 double bonds, and wherein in the case of general formula (3) R_6, R_7, R_8 and R_9 are independently of one another hydrogen atoms, straight-chain or branched alkyl groups of 1 to 30 carbon atoms, monocyclic or polycyclic cycloaliphatic radicals of 5 to 12 carbon atoms, oxyethyl groups of the general formula $-(CH_2-CH_2-O)_n-R$, wherein n is a number from 1 to 10, or an alkyl(C_1–C_4) or an acyl group, also monocyclic or polycyclic aromatic radicals and/or araliphatic radicals, which aliphatic, aromatic and araliphatic radicals maybe substituted by hydroxyl, alkoxy(C_1–C_4), secondary or tertiary amino groups, acid amide groups or acid imide groups, where the alkyl, cycloalkyl, aralkyl and aryl radicals for R_1 to R_4 may be substituted by fluorine, chlorine or bromine atoms, and in which X is a phosphorus, arsenic or antimony atom, although if X is an arsenic or antimony atom at least one of the radicals R_6 to R_9 is not a hydrogen atom and A^- is one equivalent of an anion.

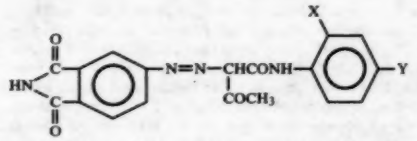
4,957,842

LIQUID DEVELOPER FOR ELECTROSTATIC LATENT IMAGES USING FLUSHED PIGMENTS

Toshiyuki Fukase, Numazu; Yoshihiro Sugiyama, Mishima; Hazime Takanashi, Numazu; Kazuo Tsubuko, Numazu, and Shinichi Kuramoto, Numazu, all of Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

Filed Oct. 23, 1986, Ser. No. 922,235
Claims priority, application Japan, Oct. 30, 1985, 60-243495
Int. Cl.[5] G03G 9/12
U.S. Cl. 430—114 11 Claims

1. In a liquid developer for developing electrostatic latent images which comprises a toner comprising a colorant and a binding agent, as the main components, dispersed in an aliphatic hydrocarbon carrier liquid, the improvement which comprises: said colorant is prepared by flushing a yellow dye or pigment having the following general formula (I).



(I)

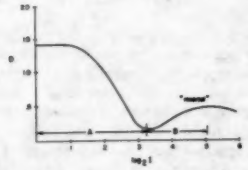
wherein X and Y represent —H, —OCH_3, —Cl, —CH_3, —CH_2CH_3, —$CH_2CH_2CH_3$, —OCH_2CH_3, —$CH_2CH_2CH_2CH_3$ or —$OCH_2CH_2CH_3$, with a resin which is insoluble in the carrier liquid and has a softening point of 50°-120° C.

4,957,843

PREVENTION OF SHORT TIME SCALE RECIPROCITY FAILURE BY VISCOSITY CONTROL

Jesse Hipps, Sr., Miamisburg, and Amy L. Burkholder, Kettering, both of Ohio, assignors to The Mead Corporation, Dayton, Ohio

Continuation of Ser. No. 255,907, Oct. 11, 1988, abandoned.
This application Oct. 5, 1989, Ser. No. 420,632
Int. Cl.[5] G03C 1/72
U.S. Cl. 430—138 14 Claims



1. A method for producing images comprising the steps of: providing a substrate having front and back surfaces, said substrate having a coating comprising photosensitive microcapsules located on either of said front or back surfaces, said microcapsules having an internal phase containing an image-forming agent, a photohardenable composition comprising a free radical addition polymerizable or crosslinkable compound, a photoinitiator comprising an ionic dyereactive counter ion compound, and a viscosity modifier being a different compound than said free radical addition polymerizable or crosslinkable compound, wherein the presence of said viscosity modifier in said internal phase has the effect of shortening the reversal time of said photosensitive microcapsules;

image-wise exposing said photosensitive microcapsules to actinic radiation of an intensity exceeding about 2000 ergs/cm^2 sec; and subjecting said microcapsules to a uniform rupturing force to enable said image-forming agent to form an image.

4,957,844

LIQUID ELECTROSTATIC DEVELOPER CONTAINING MULTIBLOCK POLYMERS

Loretta A. G. Page, Newark, Del., assignor to DXImaging, Lionville, Pa.

Filed Mar. 31, 1989, Ser. No. 331,306
Int. Cl.[5] G03G 9/12
U.S. Cl. 430—115 61 Claims

1. A liquid electrostatic developer consisting essentially of

A. nonpolar liquid having a Kauri-butanol value of less than 30, present in a major amount,

B. thermoplastic resin particles having an average by area particle size of less than 10 μm consisting essentially of a mixture of (1) 80 to 95% by weight of a thermoplastic resin and (2) 20 to 5% by weight of a multiblock copolymer compound of the general formula:

X-Y-(Z)n

wherein

X is a polymerized vinyl aromatic

Y is a polymerized diene, and

Z is a polymerized vinyl aromatic when n is 1 and a block copolymer of a polymerized vinyl aromatic and a polymerized diene when n is 2 to 10, the weight percentages based on the total weight of resin particles, and

C. a charge director compound.

4,957,845

PRINTING PLATE

Masanao Isono; Ken Kawamura; Masaya Asano; Tetuo Suzuki, and Shigeo Abiko, all of Shiga, Japan, assignors to Toray Industries, Incorporated, Tokyo, Japan

Filed May 17, 1989, Ser. No. 353,342
Claims priority, application Japan, May 18, 1988, 63-121330; May 20, 1988, 63-124684
Int. Cl.[5] G03C 1/52; G03F 7/021, 7/023
U.S. Cl. 430—156 17 Claims

1. A silicone overlying type, dry planographic printing plate of which image formation is done by photoirradiation, said dry planographic printing plate comprising a base substrate, a photosensitive layer, an ink-repellent layer and a protective layer in that specified order, with said protective layer covering the front side of said printing plate and being removable, and said protective layer containing a photofading material.

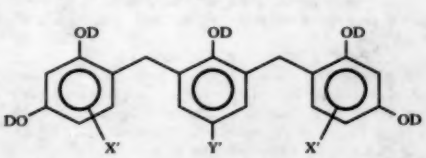
4,957,846

RADIATION SENSITIVE COMPOUND AND MIXTURES WITH TRINUCLEAR NOVOLAK OLIGOMER WITH O-NAPHTHOQUINONE DIAZIDE SULFONYL GROUP

Alfred T. Jeffries, III, Providence, R.I.; Andrew J. Blakeney, Seekonk, Mass., and Medhat A. Toukhy, Barrington, R.I., assignors to Olin Hunt Specialty Products Inc., Cheshire, Conn.

Filed Dec. 27, 1988, Ser. No. 290,009
Int. Cl.[5] G03C 1/54; G03F 7/023
U.S. Cl. 430—165 16 Claims

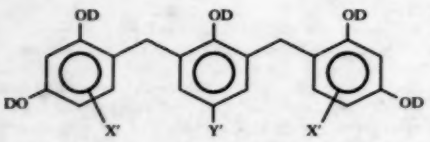
1. A photoactive compound of the formula II:



(II)

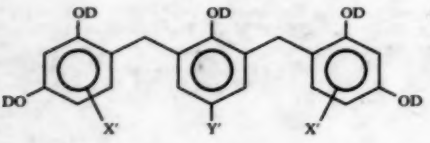
wherein each X' is selected from the group consisting of a hydrogen, OD and halide; Y' is selected from the group consisting of a lower alkyl group having 1–4 carbon atoms and a halogen atom; and D is selected from the group consisting of o-naphthoquinone diazide sulfonyl group and hydrogen; with the proviso that at least two Ds are o-naphthoquinone diazide sulfonyl groups.

6. A radiation sensitive mixture comprising an alkali-soluble binder resin and at least one photoactive compound comprising a compound of formula II:



wherein each X' is selected from the group consisting of hydrogen, OD and halide; Y' is selected from the group consisting of a lower alkyl group having 1–4 carbon atoms and halogen atom; and D is selected from the group consisting of an o-naphthoquinone diazide sulfonyl group and hydrogen; with the proviso that at least two Ds are o-naphthoquinone diazide sulfonyl groups; and wherein the amount of said binder resin being about 60% to 95% by weight and the amount of photoactive compound being from about 5% to about 40% by weight, based on the total solids content of said radiation sensitive mixture.

14. A coated substrate comprising a substrate coated with a film of a radiation sensitive mixture comprising an admixture of at least one alkali-soluble binder resin compound and at least one photoactive compound of formula II:



wherein each X' is selected from the group consisting of hydrogen, OD and halide; Y' is selected from the group consisting of a lower alkyl group having 1–4 carbon atoms and halogen atom; and D is selected from the group consisting of an o-naphthoquinone diazide sulfonyl group and hydrogen; with the proviso that at least two Ds are o-naphthoquinone diazide sulfonyl groups; and wherein the amount of said binder resin being about 60% to 95% by weight and the amount of photoactive compound being from about 5% to about 40% by weight, based on the total solid content of said light sensitive mixture.

4,957,847

HEAT-SENSITIVE CYCLIC DIAZO COMPOUND CONTAINING RECORDING MATERIAL WITH BENZOTRIAZINE COMPOUND AND COUPLING COMPONENT

Jean-Marie Adam, Rosenau, France, and Hans Baumann, Oberwil, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

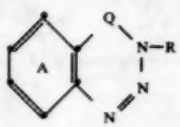
Filed Dec. 2, 1988, Ser. No. 278,989

Claims priority, application Switzerland, Dec. 11, 1987, 4849/87

Int. Cl.[5] **G03C** *1/52, 1/58;* **B41M** *5/30*

U.S. Cl. 430—170 **10 Claims**

1. A heat-sensitive recording material comprising a support and, on top of the said support, a heat-sensitive layer comprising a cyclic diazo component in sufficient quantity amount to react with coupling component to form color by coupling under the action of heat and a coupling component, in sufficient quantity amount to react with the cyclic diazo component to form an azo dye, said coupling component does not contain any acid group conferring solubility in water, and said diazo component and said coupling component being in admixture in a layer or alternatively in separate layers wherein heat enables color to form by coupling wherein the cyclic diazo component is a benzotriazine compound of the formula



(I)

wherein

Q is $—CH_2—$, —CO— or $—SO_2—$,

R is hydrogen, hydroxy, or alkyl or alkenyl having at most 12 carbon atoms, each unsubstituted or substituted by halogen, hydroxyl, cyano, lower alkoxy, lower alkylthio, C_1–C_8-acyloxy, lower alkoxycarbonyl or lower alkylsulfonyl, or is acyl, acyloxy or acylamino each having 1 to 10 carbon atoms, or cycloalkyl having 5 to 10 carbon atoms, or phenyl, phenylalkyl or naphthyl, each unsubstituted or ring-substituted by cyano, halogen, nitro, trifluoromethyl, lower alkyl, lower alkylthio, lower alkoxy, lower alkylcarbonyl or lower alkoxycarbonyl, or is a heterocyclic radical, and

the benzene ring A is unsubstituted or substituted by halogen, cyano, nitro, lower alkyl, lower alkoxy, lower alkylthio, lower alkylcarbonyl or lower alkoxycarbonyl.

4,957,848

HEAT DEVELOPABLE COLOR LIGHT-SENSITIVE MATERIAL WITH DYE DEVELOPERS

Osamu Takahashi; Koichi Koyama, and Keizo Koya, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 831,675, Feb. 21, 1986, Pat. No. 4,766,056. This application May 10, 1988, Ser. No. 192,097

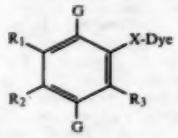
Claims priority, application Japan, Feb. 21, 1985, 60-33491; Apr. 2, 1985, 60-69716; May 29, 1985, 60-116149

The portion of the term of this patent subsequent to Aug. 23, 2005, has been disclaimed.

Int. Cl.[5] **G03C** *5/54*

U.S. Cl. 430—203 **10 Claims**

1. A method for forming a color image which comprises heating a color light-sensitive material after or simultaneously with image-wise exposure of said material to light, wherein the color light-sensitive material comprises a support having thereon at least one light-sensitive silver halide-containing layer, a binder, a compound represented by formula (A), and a compound or precursor thereof which reacts with an oxidized compound formed from the compound of formula (A), thereby converting the oxidized compound into a non-diffusible form, said compound of formula (A) being represented by



(A)

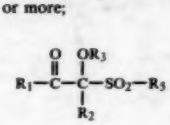
wherein R_1, R_2, and R_3 each represents a hydrogen atom, an alkyl group, a cycloalkyl group, an aryl group, an aralkyl group, an alkoxy group, an aryloxy group, an acylamino group, an alkylthio group, an arylthio group, or a halogen atom, provided that at least one of R_1, R_2, and R_3 represents a hydrogen atom; X represents a chemical bond or a divalent

linking group; Dye represents an image-forming dye moiety; and G represents a hydroxyl group or a group capable of forming a hydroxyl group upon heating and/or by the action of a base, wherein the compound or precursor thereof which reacts with an oxidized compound formed from the compound of formula (A) is selected from the following compounds represented by formula Ia, (II), and (III) wherein said compound represented by formula (I) is represented by formula (I-a)

(I-a)

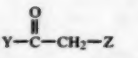
wherein A represents an atomic group forming a substituted or unsubstituted aromatic or heterocyclic ring condensed with the benzene ring; M represents a hydrogen atom, an ammonium ion, or a metal ion; l represents 1 or 2; and m represents an integer of 1 or more;

(II)



wherein R_1 represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted aryl group, or a substituted or unsubstituted heterocyclic ring; R_2 represents a hydrogen atom, a halogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted aryl group, a substituted or unsubstituted acyloxy group, or a substituted or unsubstituted sulfonyl group; R_3 represents a hydrogen atom or a group which can be hydrolyzed, and R_5 represents a substituted or unsubstituted alkyl group, a substituted or unsubstituted aryl group, or a substituted or unsubstituted heterocyclic ring;

(III)



wherein Y represents an aliphatic group or an aromatic group; and Z represents an electron-attractive group; provided that at least one of Y and Z contains a non-diffusing group having from 16 to 30 carbon atoms.

4,957,849

SILVER HALIDE PHOTOGRAPHIC MATERIAL AND IMAGE-FORMING METHOD USING THE SAME

Nobuaki Inoue, and Senzo Sasaoka, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 33,375, Apr. 2, 1987, abandoned. This application Mar. 14, 1989, Ser. No. 323,059

Claims priority, application Japan, Apr. 2, 1986, 61-77274; Jul. 1, 1986, 61-154334

Int. Cl.[5] G03C 1/08

U.S. Cl. 430—264 **16 Claims**

1. A silver halide photographic material, comprising:

a support having provided thereon at least one silver halide emulsion layer; and

a hydrazine derivative contained in said emulsion layer or in at least one other hydrophilic colloidal layer,

wherein said emulsion layer comprises:

a first monodispersed silver halide emulsion containing large monodispersed silver halide grains, wherein said large monodispersed silver halide grains are not chemically sensitized; and

a second monodispersed silver halide emulsion containing small monodispersed silver halide grains, wherein said small monodispersed silver halide grains are chemically sensitized by means of at least one process selected from the group consisting of a sulfur-sensitization process and a gold-sensitization process,

wherein said small and large monodispersed silver halide grains differ from each other in mean grain size, wherein the mean grain size of said small monodispersed silver halide grains is 90% or less of that of said large monodispersed silver halide grains, wherein said large and small monodispersed silver halide grains have mean grain sizes of from 0.02 to 0.5 μm, and wherein said first monodispersed silver halide emulsion and said second monodispersed silver halide emulsion have a sensitivity difference of from 0.1 to 1.0 Δ log E.

2. The silver halide photographic material as claimed in claim 1, wherein the sensitivity difference between the first monodispersed emulsion and the second monodispersed emulsion is 0.2 to 0.7 Δlog E.

4,957,850

PHOTOSENSITIVE FLEXOGRAPHIC RESIN PLATE

Hidefumi Kusuda, Takatsuki; Katsuji Konishi, Ibaraki, and Kazunori Kanda, Yao, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

Continuation of Ser. No. 344,504, Apr. 27, 1989, abandoned, which is a continuation of Ser. No. 67,121, Jun. 29, 1987, abandoned. This application Feb. 12, 1990, Ser. No. 478,562

Claims priority, application Japan, Jun. 27, 1986, 61-152009

Int. Cl.[5] G03C 1/76

U.S. Cl. 430—271 **8 Claims**

1. A photosensitive flexographic resin plate comprising a base plate and a photosensitive resin layer formed by applying thereon a resin composition which consists essentially of:

(a) 20 to 95% by weight of a resin having rubber elasticity selected from a group consisting of butadiene polymer, isoprene polymer, chloroprene polymer, butadiene-styrene copolymer, polystyrene-polybutadiene-polystyrene block copolymer, polystyrene-polyisoprene-polystyrene block copolymer, butadiene-(meth)acrylic acid-acrylic ester copolymer, butadiene-(meth)acrylic acid-styrene copolymer and butadiene-(meth)acrylic acid-acrylonitrile copolymer,

(b) 1 to 80% by weight of an unsaturated monomer,

(c) 0.01 to 10% by weight of a photopolymerization initiator and

(d) 0.1 to 50% by weight of resin particles having an average particle size of about 0.01 to 6 micron which are prepared by suspension or emulsion polymerization of an ethylenically unsaturated monomer and a monomer having at least two radical-polymerizable unsaturated groups, % being based on the amount of said resin composition;

and said resin composition, when cured by exposure to ultraviolet beams, exhibiting a JIS A hardness of 30° to 80° and an impact resilience of at least 20%.

4,957,851

IMAGE RECORDING MEDIUM COMPRISING A DIACETYLENE DERIVATIVE COMPOUND FILM AND A RADIATION ABSORBING LAYER

Yoshinori Tomida; Hiroshi Matsuda, both of Yokohama; Kunihiro Sakai, Tokyo; Yukuo Nishimura, Sagamihara; Takashi Nakagiri, and Toshihiko Miyazaki, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 851,090, Apr. 14, 1986, abandoned. This application Sep. 6, 1988, Ser. No. 240,490

Claims priority, application Japan, Apr. 16, 1985, 60-80852; Apr. 16, 1985, 60-80855

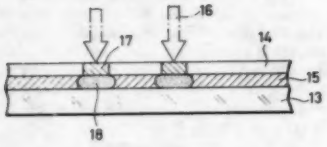
Int. Cl.[5] G03C 1/78, 1/94, 1/68

U.S. Cl. 430—272 **11 Claims**

1. An image-forming medium comprising a substrate, an image-forming layer provided on said substrate and a radiation-absorbing layer provided on said image-forming layer;

said image-forming layer comprising a monomolecular film of a polydiacetylene derivative compound or its built-up

film, a monomer of said polydiacetylene derivative compound being represented by the formula



$$R13\ C{\equiv}C{-}C{\equiv}C{-}(R')_n{-}X$$

4,957,852

HOT EMBOSSING PLATES CROSSLINKABLE BY PHOTOPOLYMERIZATION

Bernd Bronstert, Otterstadt, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 10, 1988, Ser. No. 205,343

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1987, 3719871

Int. Cl.[5] G03C *1/70, 5/16*

U.S. Cl. 430—283 **23 Claims**

1. A hot embossing plate crosslinkable by photopolymerization, comprising:

(a) a heat-stable, dimensionally stable base; and

(b) a relief-forming layer which is crosslinkable by photopolymerization, soluble or dispersible in water and more than 0.8 mm thick, the relief-forming layer (b) containing:

(b_1) one or more partially or virtually completely hydrolyzed polyvinyl alkanecarboxylates as binders, and, as further binders,

(b_{11}) alkenecarboxylates, or alkenecarbonylamino-N-methylene ethers of partially or virtually completely hydrolyzed polyvinyl alkanecarboxylates, or

(b_{12}) alkenecarbonylamino-N-methylene ethers of partially or virtually completely hydrolyzed graft copolymers of vinyl alkanecarboxylates and alkylene oxides, or mixtures of b_{11} and b_{12}; and furthermore

(b_2) one or more alkanecarbonylamino-N-methylene ethers of polyhydric alcohols as photopolymerizable monomers; and

(b_3) one or more photopolymerization initiators.

4,957,853

SILVER HALIDE COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING CYAN COUPLER AND METHOD FOR USE THEREOF

Hidetoshi Kobayashi, and Toshihiro Nishikawa, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation-in-part of Ser. No. 917,116, Oct. 8, 1986, abandoned. This application Jan. 27, 1988, Ser. No. 149,040

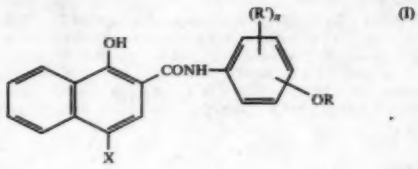
Claims priority, application Japan, Oct. 8, 1985, 60-224345

The portion of the term of this patent subsequent to Jun. 6, 2006, has been disclaimed.

Int. Cl.[5] G03C *7/34*

U.S. Cl. 430—384 **15 Claims**

1. A method for producing a photographic image which comprises developing an exposed silver halide color photographic light-sensitive material with a developer comprising an aromatic primary amine-developing agent, wherein said silver halide color photographic light-sensitive material has at least one light-sensitive silver halide emulsion layer provided on a support and said photographic material contains at least one non-diffusible, oil-soluble cyan dye-forming coupler represented by formula (I)



(I)

wherein R represents a substituted or unsubstituted branched alkyl group or an alkyl group substituted with other than an alkyl group, said R containing 6 or more carbon atoms and said R not being substituted with (1) a carboxyl group which is not substituted, (2) a sulfo group which is not substituted, (3) a carboxyl group which is substituted with a metal atom, (4) a carboxyl group which is substituted with an $—NH_4$ group, (5) a sulfo group which is substituted with a metal atom of (6) a sulfo group which is substituted with an $—NH_4$ group; X represents a hydrogen atom or a non-photographically-useful group which can be released therefrom upon coupling with an oxidized form of an aromatic primary amine developing agent; R′ represents a group which can be substituted at a phenyl nucleus other than a group which can be represented by OR; and n is an integer of from 0 to 4, said coupler being incorporated into the emulsion by an oil-in-water dispersion process.

4,957,854

OPTICAL RECORDING MEDIUM

Yoshihiro Oguchi, Yokohama; Yoshio Takasu, Tama, and Kyo Miura, Sagamihara, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 8, 1988, Ser. No. 179,262

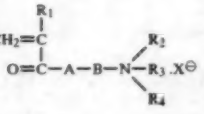
Claims priority, application Japan, Apr. 13, 1987, 62-91460

Int. Cl.[5] G11B *7/24*

U.S. Cl. 430—495 **12 Claims**

1. An optical recording medium comprising an organic thin film recording layer on a substrate, which performs recording of information by forming a pit with photoenergy, said organic thin film recording layer comprising an organic dye and a polymeric surfactant, wherein said polymeric surfactant is a cationic polymeric surfactant comprising a polymer having a monomer represented by the following formula [I]:

Formula [I]



wherein R_1 is H or CH_3; R_2 and R_3 are alkyl groups having 1 to 4 carbon atoms or hydroxyalkyl groups having 2 to 4 carbon atoms, which may be either the same or different; R_4 is H, an alkyl group having 1 to 4 carbon atoms, an hydroxyalkyl group having 2 to 4 carbon atoms, or a benzyl group; A is an oxygen atom or NH; B is an alkylene group having 1 to 4 carbon atoms or an hydroxyalkylene group having 2 to 4 carbon atoms; and $X^{\ominus}$ is an anionic counterion.

4,957,855

PHOTOGRAPHIC RECORDING MATERIAL WITH IMPROVED RAW STOCK KEEPING

Gladys L. MacIntyre, Clyde, and Roger Lok, Hilton, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 21, 1989, Ser. No. 410,693

Int. Cl.[5] G03C *1/34*

U.S. Cl. 430—611 **6 Claims**

1. A photographic recording material comprising a support, a silver halide emulsion layer and from about 1.5 mmoles to about 5.0 mmoles per mole of silver of an antifogging agent

which is a combination of two compounds comprising, for each mole of 1-(3-acetamidophenyl)-5-mercaptotetrazole, from 0.3 to 4.0 mole of 1-(3-methoxyphenyl)-5-mercaptotetrazole.

4,957,856

SILVER HALIDE PHOTOGRAPHIC MATERIAL

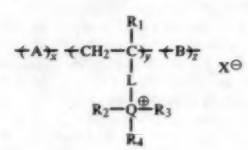
Koichi Suematsu, Shizuoka; Sumito Yamada, Kanagawa; Shigeru Ohno, Kanagawa, and Tadashi Ito, Kanagawa, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 8, 1989, Ser. No. 307,704
Claims priority, application Japan, Feb. 8, 1988, 63-026978
Int. Cl.[5] G03C *1/84*
U.S. Cl. 430—518 **10 Claims**

1. A silver halide photographic material which comprises a support having provided thereon at least one light-sensitive silver halide emulsion layer and at least one subbing layer, wherein said at least one subbing layer comprises:

(a) a binder;

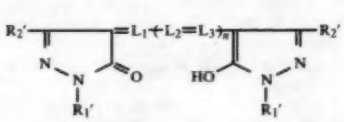
(b) a polymer represented by formula (I):



(I)

wherein A represents an ethylenic unsaturated monomer unit, R_1 represents a hydrogen atom or a lower alkyl group having from 1 to 6 carbon atoms, L represents a divalent group having from 1 to 12 carbon atoms, R_2, R_3 and R_4, which may be the same or different, each represents an alkyl group, an aralkyl group or a hydrogen atom, Q represents nitrogen or phosphorous, provided that R_2, R_3 and R_4 may be linked together to form, together with Q, a cyclic structure, $X\ominus$ represents an anion other than iodine ion, B represents a structural unit in which copolymerizable monomers having at least two ethylenic unsaturated groups have been copolymerized, x is selected to constitute from 0 to 90 mol%, y is selected to constitute from 10 to 100 mol%, and z is selected to constitute from 0 to 90 mol%;

(c) a dye represented by formula (II);



(II)

wherein R_1' represents an aryl, alkyl, aralkyl, or heterocyclic group substituted with at least one carboxylic acid or sulfonic acid group, R_2' represents a group —$CONR_3'R_4'$ or a group —$NR_3'COR_4'$ wherein R_3' represents a hydrogen atom or an alkyl group, and R_4' represents an alkyl group having a hydrophobic substituent constant π within a range from 1.60 to 3.9, L_1 L_2, and L_3 each represents a methine group, and η represents 0, 1 or 2; and

(d) a nonionic surface active agent.

4,957,857

STABILIZATION OF PRECIPITATED DISPERSIONS OF HYDROPHOBIC COUPLERS

Krishnan Chari, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 23, 1988, Ser. No. 288,922
Int. Cl.[5] G03C *7/25, 7/32*
U.S. Cl. 430—546 **24 Claims**

1. A method of forming precipitated coupler dispersions comprising

forming a water solution by dissolving in water a nonionic polymer and an anionic surfactant, said surfactant having a hydrophilic head group comprising sulfate or sulfonate and a hydrophobic tail group comprising between about 8 and about 20 carbon atoms.

forming a solvent solution by dissolving a coupler in a basic solvent solution,

combining said solvent solution and said water solution, and

adding acid to form a neutral combined solution containing a dispersion of coupler particles

with the proviso that said coupler dispersion does not precipitate after three weeks' storage.

4,957,858

REPLICATIVE RNA REPORTER SYSTEMS

Barbara Chu, Del Mar, Calif.; Fred R. Kramer, New York, N.Y.; Paul Lizardi, Cuernavaca, Mexico, and Leslie E. Orgel, La Jolla, Calif., assignors to The Salk Instute for Biological Studies, San Diego, Calif. and The Trustees of Columbia University, New York, N.Y.

Filed Apr. 16, 1988, Ser. No. 852,692
Int. Cl.[5] C12Q *1/68*
U.S. Cl. 435—6 **45 Claims**

1. A method of determining the presence of a biopolymer analyte in a sample, which method comprises

(i) exposing the sample to an affinity molecule for said analyte under conditions whereby binding occurs between the affinity molecule and the analyte;

(ii) if said affinity molecule is not itself a replicative RNA, which is a template for replication in vitro by Qβ replicase, joining, either before or after step (i), a replicative RNA, which is a template for replication in vitro by Qβ replicase, to the affinity molecule employed in step (i);

(iii) employing Qβ replicase to catalyze replication of replicative RNA, which (a) is a template for replication in vitro by Qβ replicase and (b) or had been joined to affinity molecule bound to analyte or is affinity molecule that had been bound to analyte; and

(iv) detecting RNA made by the reaction of step(iii).

27. An affinity molecule-replicative RNA hybrid wherein the affinity molecule is joined to a replicative RNA, which is a template for replicatior. in vitro by Qβ replicase, through a first linking moiety, joined to said replicative RNA without eliminating the replicability thereof by Qβ replicase, and a second linking moiety, joined to the affinity molecule without eliminating the specificity of binding between affinity molecule and its analyte, said first and second linking moieties being covalently joined to each other or being a specific binding pair.

4,957,859

ANTIBODIES FOR TRANSFORMING RAS PROTEIN

Diane Bizub, Glenside, Pa.; Ellyn Fischberg-Bender, Ossing, N.Y., and Anna M. Skalka, Princeton, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Feb. 16, 1988, Ser. No. 156,133
Int. Cl.[5] G01N *33/53, 33/543, 33/544*
U.S. Cl. 435—7 **11 Claims**

1. A monoclonal antibody selectively binding for ras p21 TLeu61 transforming protein and non-cross reactive with any other ras p21 protein.

4,957,860

METHOD FOR PRODUCING OLIGOSACCHARIDE

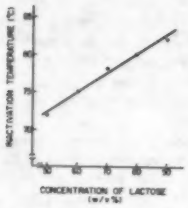
Tatsuhiko Kan, and Yoichi Kobayashi, both of Tokyo, Japan, assignors to Kabushiki Kaisha Yakult Honsha, Tokyo, Japan

Filed Oct. 26, 1987, Ser. No. 112,068

Claims priority, application Japan, Oct. 27, 1986, 61-253857

Int. Cl.[5] C12P *19/04;* **C12N** *9/38, 1/14;* **C07H** *3/00*

U.S. Cl. 435—101 **5 Claims**



1. A process of producing oligosaccharides of the formula: Gal—$(Gal)_n$—Glc, wherein Gal denotes a galactose residue, Glc represents a glucose residue and n is an integer of 1 to 4, comprising:

reacting lactose at a concentration in a reaction mixture ranging from 50 to 90% (w/v) with β-galactosidase derived from *Aspergillus oryzae* at a reaction temperature ranging from 55° to 83° C.

4,957,861

PROCESS FOR THE BIOTECHNOLOGICAL PREPARATION OF POLY-D-(−)-3-HYDROXYBUTYRIC ACID

Robert M. Lafferty, and Gerhart Braunegg, both of Graz, Austria, assignors to Petrochemie Danubia Ges.m.b.H., Mannsworth, Austria

Continuation of Ser. No. 675,970, Nov. 23, 1984, abandoned. This application Nov. 20, 1987, Ser. No. 123,085

Claims priority, application Fed. Rep. of Germany, Dec. 1, 1983, 3343576

The portion of the term of this patent subsequent to Nov. 22, 2005, has been disclaimed.

Int. Cl.[5] C12P *7/42;* **C12N** *1/20*

U.S. Cl. 435—146 **14 Claims**

1. A process for the biotechnological preparation of poly-D-(−)-3-hydroxybutyric acid, hereinafter referred to as PHB, which comprises aerobically culturing a strain of the microorganism *Alcaligenes latus* or a PHB-producing mutant derived from this microorganism in an aqueous nutrient medium containing sources of assimilable carbon, nitrogen and phosphorus and the amount of trace nutrients required for the growth of the microorganism, wherein the source of nitrogen is a water-soluble ammonium salt, with a complete supply of nutrients optimum for the growth of the microorganism, under unlimited growth conditions in the temperature range from 36° to 42° C. at a dissolved oxygen content of 25 to 50% of the saturation value for air and a pH value of 6.5 to 7.5, under sterile conditions, and isolating the PHB by extraction from the biomass thereby obtained.

4,957,862

MICROBIOLOGICAL PROCESS FOR THE PREPARATION OF METHYL KETONES

Catherine Creuly, Lempdes; Jean-Bernard Gros, Chamalieres, and Christian Larroche, Clermont-Ferrand, all of France, assignors to Sanofi, Paris, France

Filed Feb. 21, 1990, Ser. No. 482,710

Claims priority, application France, Feb. 27, 1989, 89 02524

Int. Cl.[5] A23L *1/221;* **C12P** *7/26;* **C12R** *1/80, 1/685*

U.S. Cl. 435—148 **14 Claims**

1. A process for the preparation of C_5 to C_{10} aliphatic methyl ketones by the aerobic biotransformation of C_6 to C_{11} fatty acids with spores of filamentous fungi of the genus Amastigomycota, wherein the reaction medium is a C_8 to C_{20} aliphatic hydrocarbon or a mixture of such hydrocarbons containing at most 20% of water.

4,957,863

METHOD OF INCREASING YIELD OF T-PA IN CELL CULTURE

Michael A. Sanzo, St. Louis; Medora M. Hardy, Chesterfield, and Joseph Feder, St. Louis, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Jan. 26, 1988, Ser. No. 148,409

Int. Cl.[5] C12N *9/64*

U.S. Cl. 435—228 **7 Claims**

1. The method of increasing the yield of tissue plasminogen activator in culture of mammalian cells comprising introducing antibodies to the t-PA of said cells into the cell culture nutrient medium, wherein said antibodies are such that they recognize an epitope on said t-PA and, when complexed with said t-PA, effectively prevent feedback inhibition of t-PA production by said cells, allowing the cells to grow, and then recovering t-PA from the t-PA-antibody complex thus formed in the conditioned medium by exchanging antibody in the complex for t-PA antibody immobilized on an inert support.

4,957,864

NOVEL PLASMINOGEN ACTIVATOR AND ITS PREPARATION PROCESS

Seishi Takahashi, Yokohama, Japan, assignor to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Continuation of Ser. No. 66,524, Jun. 26, 1987, abandoned, which is a continuation of Ser. No. 621,918, Jun. 13, 1984, abandoned. This application Jun. 30, 1988, Ser. No. 213,489

Claims priority, application Japan, Oct. 29, 1982, 57-189067

Int. Cl.[5] C12N *9/64*

U.S. Cl. 435—226 **1 Claim**

1. A process for preparing a plasminogen activator having the following characteristic properties:

(1) a main protein band obtained by sodium dodecyl sulfate-polyacrylamide gel electrophoresis having a molecular weight of approximately 70,000 ±5,000;

(2) a main band obtained by isoelectric-point electrophoresis having a pI in the range of 7 to 9;

(3) an immunological property of not being adsorbed by antiurokinase IgG-agarose affinity chromatography; and

(4) a property wherein plasminogen activator hydrolyzes H-D-valyl-L-leucyl-L-lysine-p-nitroanilide dihydrochloride and H-D-isoleucyl-L-prolyl-L-arginine-p-nitroanilide dihydrochloride, but does not hydrolyze Boc-L-valyl-L-prolyl-L-arginine-4-methylcoumaryl-7-amide, carbobenzoxyl-L-phenylalanyl-L-arginine-4-methylcoumaryl-7-amide, 1-prolyl-L-phenylalanyl-L-arginine-4-methylcoumaryl-7-amide and glutaryl-glycyl-L-arginine-4-methylcoumaryl-7-amide, which process comprises:

(i) subjecting a human blood vessel or kidney to an extraction treatment with an ammonium thiocyanate solution;

(ii) salting the extract out with an $(NH_4)_2SO$ solution, passing the resulting solution through an arginine agarose column, and then washing the column with an arginine solution to elute the adsorbed plasminogen activator thereunto;

(iii) passing the fraction of the eluted plasminogen activator in step (ii) through a phenyl-agarose column and washing the column with an ethylene glycol solution or a nonionic surfactant solution to elute the adsorbed plasminogen activator thereunto;

(iv) passing the fraction of the eluted plasminogen activator in step (iii) through a dextran gel column then through a fibrin-agarose column;

(v) eluting with a NH_4SCN solution; and

(vi) then recovering the plasminogen activator in the solution.

4,957,865

CLONING OR EXPRESSION VECTORS CONTAINING THE AVIAN ERYTHROBLASTOSIS VIRUS GENOME AND CELLS TRANSFECTED BY THESE VECTORS

Jacques Samarut, Villeurbanne; Gérard Verdier, Fontaines S/Saone; Miloud Benchaibi, Villeurbanne; Pierre Savatier, Lyon; Didier Poncet, Lyon; Frédéric Flamant, Lyon; Jiao-Hao Xiao, Strasbourg Cedex; Pierrick Thoraval, Villeurbanne; Frédérique Chambonnet, Saint.Etienne, and Victor Nigon, Villeurbanne, all of France, assignors to Institut National de la Recherche Agronomique (INRA), Paris, France

PCT No. PCT/FR85/00293, § 371 Date Jun. 4, 1986, § 102(e) Date Jun. 4, 1986, PCT Pub. No. WO86/02380, PCT Pub. Date Apr. 24, 1986

PCT Filed Oct. 15, 1985, Ser. No. 879,103

Claims priority, application France, Oct. 15, 1984, 84 15764

Int. Cl.[5] C12N *7/00, 15/00;* C12P *21/00*

U.S. Cl. 435—235 19 Claims

1. An infectious virus for cloning or expression of a foreign gene, wherein said virus comprises all or part of the genome of an avian erythroblastosis virus, two LTR sequences from said avian retrovirus genome, at least one foreign gene situated between said LTR sequences, and two mRNA splicing sites.

4,957,866

METHOD FOR REPRODUCING CONIFEROUS PLANTS BY SOMATIC EMBRYOGENESIS

Pramod K. Gupta, Federal Way, and Gerald S. Pullman, Renton, both of Wash., assignors to Weyerhaeuser Company, Tacoma, Wash.

Filed Mar. 9, 1989, Ser. No. 321,035

Int. Cl.[5] A01H *4/00, 7/00*

U.S. Cl. 435—240.4 24 Claims

1. A method for reproducing coniferous plants by somatic embryogenesis which comprises;

placing a suitable explant on an induction culture medium with a sufficient amount of plant growth hormones and relatively low in osmoticants and growing a culture containing early stage proembryos, the osmotic potential of said induction medium being below about 175 mM/kg; and

transferring the early sttage proembryos from the induction culture to a late stage proembryo development culture medium having a sufficient amount of plant growth hormones and a significantly increased concentration of osmoticants for a sufficient time and under suitable environmental conditions for development of late stage proembryos, said development culture having an osmotic potential in the range of about 200-400 mM/kg.

4,957,867

PRODUCTION OF CYCLOPENTENONES BY ENZYME RESOLUTION

Masayoshi Minai, Moriyama; Yuji Ueda, Izumi; Takayuki Higashii, Kishiwada; Michitada Kondo, Kobe, and Seiichi Kai, Nara, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

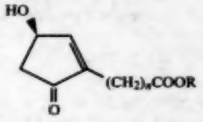
Filed May 29, 1987, Ser. No. 55,362

Claims priority, application Japan, May 29, 1986, 61-125381; Nov. 5, 1986, 61-263464; Mar. 27, 1987, 62-075611; Mar. 30, 1987, 62-079297

Int. Cl.[5] C12P *7/62, 7/38*

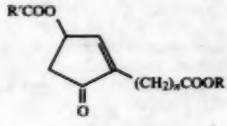
U.S. Cl. 435—280 37 Claims

1. A process for preparing an optically active cyclopentenone of the formula:



(I)

wherein R is a hydrogen atom or a lower alkyl group and n is an integer of 4 to 8, which comprises contacting a dicyclopentenone ester of the formula:



(II)

wherein R and n are each as defined above and R, is a lower alkyl group, or a lower alkyl group substituted with halogen, with an enzyme having a capability of hydrolyzing selectively either one of the d- or l-form isomers of the dl-cyclopentenone ester (ii) in an aqueous medium for asymmetric hydrolysis.

4,957,868

CYLINDRICAL HOLLOW CARRIERS FOR MICROORGANISMS MADE OF NONWOVEN FABRIC

Yoshinori Yushina; Jun Hasegawa, and Hiromi Satoh, all of Yokohama, Japan, assignors to Chiyoda Chemical Engineering & Constructions Co., Ltd., Yokaham, Japan

Continuation-in-part of Ser. No. 805,275, Dec. 5, 1985, abandoned. This application Aug. 31, 1988, Ser. No. 239,185

Claims priority, application Japan, Dec. 24, 1984, 59-270719; Jun. 20, 1988, 63-150117

Int. Cl.[5] C12M *1/40;* C12N *11/00, 11/02, 11/08*

U.S. Cl. 435—288 20 Claims

11. A hollow cylindrical carrier for microorganisms having a compression weight of not less than 400 g per carrier, said carrier being made by a process which comprises subjecting a nonwoven fabric having a specific gravity of not greater than 1.0 to a surface smoothing treatment at an elevated temperature of 200° to 450° C., then pressing with a roller to give a nonwoven fabric a thickness of 1 to 5 mm and a weight per unit area of 30 to 300 mg/cm^2 and then forming the nonwoven fabrics into a cylindrical hollow shape; said compression weight being measured by applying a spot weight to an upper part of the cylindrical hollow shaped carrier having an outer diameter of 50 mm and a length of 50 mm and gradually increasing the weight until the upper part is brought into contact with the lower part.

4,957,869

IMMUNOGENIC PEPTIDE CORRESPONDING TO *P. VIVAX* CS PROTEIN

David E. Arnot; Vincenzo Enea; Ruth S. Nussenzweig, and Victor N. Nussenzweig, all of New York, N.Y., assignors to New York University, New York, N.Y.

Continuation of Ser. No. 754,645, Jul. 12, 1985, abandoned. This application Apr. 5, 1988, Ser. No. 180,606

Int. Cl.[5] **C12N** *15/00*; **C07K** *5/00*; **C07H** *15/12*

U.S. Cl. 435—320 **8 Claims**

1. DNA encoding an immunogenic peptide said peptide comprising the amino acid sequence Asp-Arg-Ala-X-Gly-Gln-Pro-Ala-Gly repeated at least twice wherein X is independently selected from the group consisting of Asp and Ala, said peptide having the property of eliciting formation of antibodies that recognize the immunodominant epitope of the *P. vivax* circumsporozoite surface protein on the surface of sporozoites, said DNA being essentially purified; provided that said peptide is not said surface protein.

4,957,870

DETECTION OF RETICULOCYTES, RNA AND DNA

Linda G. Lee, Mountain View, and Chia-Huei Chen, San Jose, both of Calif., assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.

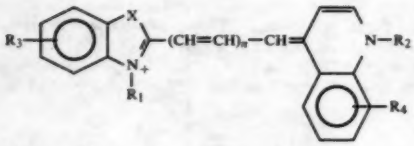
Division of Ser. No. 81,097, Aug. 3, 1987, Pat. No. 4,883,867, which is a continuation-in-part of Ser. No. 793,813, Nov. 1, 1985, abandoned. This application Apr. 3, 1989, Ser. No. 332,657

Int. Cl.[5] **G01N** *33/48, 33/00*

U.S. Cl. 436—63 **10 Claims**

1. In a process for detecting reticulocytes, RNA or DNA in a sample, the improvement comprising:

adding to said sample a fluorescent dye having the formula



wherein:

X=O, S, Se or C $(CH_3)_2$;

R_1=alkyl having from 1–6 carbons;

R_2=alkyl having from 1–6 carbons;

R_3=fused benzene, alkyl (having 1–6 carbons), methoxy or hydrogen;

R_4=alkyl having 1–6 carbons, methoxy or hydrogen; and

n=zero or an integer from 1–6;

exciting said sample with light of excitation wavelength; and measuring fluorescence emitted from said sample.

4,957,871

METHOD FOR DETECTING IMPURITIES IN AN OIL SAMPLE

David J. Fisher, North Adams, Mass., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Division of Ser. No. 50,924, May 15, 1987, Pat. No. 4,873,056, which is a continuation of Ser. No. 529,154, Sep. 2, 1983, Pat. No. 4,686,192. This application Jun. 22, 1989, Ser. No. 370,231

Int. Cl.[5] **G01N** *21/03, 21/07*

U.S. Cl. 436—165 **14 Claims**

2. A method for detecting the presence of polychlorinated biphenyl in an oil sample, utilizing a chemical test kit comprising first and second flexible containers, said first container comprising at least one breakable capsule mounted within said first container and containing an alkali metal and means for separating an aqueous layer from an oil layer into said second container, said second container comprising at least two breakable capsules mounted within said second container, one of said capsules containing a mercury titrant and the other capsule containing a dye indicator, comprising the steps of:

(a) introducing the oil sample into said first container;

(b) breaking said capsule containing the alkali metal in said first container;

(c) then shaking said first container;

(d) adding a buffered acid solution to said first container;

(e) then shaking said first container;

(f) separating the aqueous layer from the oil layer by transferring the aqueous layer through said separating means into said second container;

(g) breaking said capsule containing the mercury titrant in said second container;

(h) then shaking said second container;

(i) breaking said capsule containing the dye indicator in said second container; and

(j) then shaking said second container;

(k) detecting the color of the aqueous liquid in said second container.

4,957,872

METHOD FOR THE DETERMINATION OF REDOX REACTIONS USING IODATE TO ELIMINATE ASORBIC ACID INTERFERENCE

Laszlo Koever; Walter Rittersdorf, and Wolfgang Werner, all of Mannheim, Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

Continuation of Ser. No. 941,406, Dec. 15, 1986, Pat. No. 4,743,559, which is a continuation of Ser. No. 779,594, Sep. 24, 1985, abandoned, which is a continuation of Ser. No. 246,807, Mar. 23, 1981, abandoned. This application Jan. 20, 1988, Ser. No. 145,901

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1980, 3012368

The portion of the term of this patent subsequent to May 10, 2005, has been disclaimed.

Int. Cl.[5] **G01N** *1/00, 21/78*

U.S. Cl. 436—175 **15 Claims**

1. A method for determining an analyte in a test system which contains said analyte and ascorbic acid as an interfering reducing agent utilizing a redox reagent system, said redox reagent system comprising a redox indicator which forms a visually or photometrically detectable or assessible color by means of a redox reaction, comprising:

(a) contacting said redox reagent system with an amount of soluble iodate in excess of the amount necessary to remove ascorbic acid in said test system;

(b) contacting said test system to said soluble iodate and redox reagent system;

(c) reacting said ascorbic acid with said iodate at a pH of from 5 to 9 to eliminate said ascorbic acid as an interfering reducing agent; and

determining in the presence of iodate in excess of the amount necessary to react with said ascorbic acid visually or photometrically detectable or assessable color as an indication of said analyte.

4,957,873

PROCESS FOR FORMING ISOLATION TRENCHES IN SILICON SEMICONDUCTOR BODIES

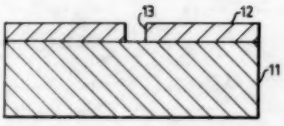
Sureshchandra M. Ojha; Paul J. Rosser, both of Harlow, and Philip B. Moynagh, Buckhurst Hill, all of Great Britain, assignors to STC PLC, London, England

Continuation of Ser. No. 253,971, Oct. 5, 1988, abandoned. This application Sep. 21, 1989, Ser. No. 411,196

Claims priority, application United Kingdom, Oct. 7, 1987, 8723539

Int. Cl.[5] H01L *21/266*

U.S. Cl. 437—20 2 Claims



1. A method of fabricating an oxide-filled isolation trench in a major surface of a silicon semiconductor substrate, the trench having a width of about 1 micron and having a depth exceeding its width, the method consisting of the steps of applying a mask to said surface, said mask having an opening defining the position and width of the trench, implanting phosphorus or arsenic dopant ions into the substrate via said opening to a concentration of at least 5×10^{20} cm^{-3} and to a depth of about 8 microns, removing the mask, and subjecting the dopant substrate to an oxygen atmosphere at a temperature of 850° to 950° C. at a pressure of 10 to 20 atmospheres so as to convert preferentially the doped silicon to silicon oxide to depth of about 6 microns and a width of about 1 micron thereby forming the isolation trench, said preferential conversion of doped silicon to silicon oxide being confined substantially to a linear growth of oxide.

4,957,874

SELF-ALIGNED BI-CMOS DEVICE HAVING HIGH OPERATION SPEED AND HIGH INTEGRATION DENSITY

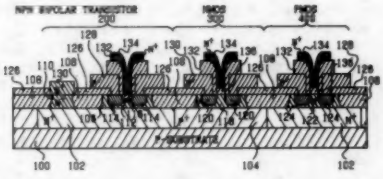
Katsumoto Soejima, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Nov. 28, 1988, Ser. No. 276,781

Claims priority, application Japan, Nov. 27, 1987, 62-298996

Int. Cl.[5] H01L *21/00, 21/02, 21/22, 21/26*

U.S. Cl. 437—31 2 Claims



1. A process for manufacturing a semiconductor device which includes at least one bipolar transistor, one N-channel MOS transistor and one P-channel transistor which are formed in the same semiconductor substrate at the same semiconductor layer level, comprising:

preparing a substrate including a bipolar transistor section including a collector region formed in said semiconductor substrate, and a first conduction type well for a first type MOS transistor and a second conduction type well for a second type MOS transistor, the bipolar transistor section, the first conduction type well and the second conduction type well being isolated from each other and covered by a first insulating layer formed on the principal surface of the semiconductor substrate;

selectively etching said first insulating layer to expose a portion of said bipolar transistor section and forming a first polycrystalline semiconductor layer on said first insulating layer and said exposed portion of said bipolar transistor section;

selectively doping a first impurity to a portion of said first polycrystalline semiconductor layer on said exposed portion of said bipolar transistor section and on said first conduction type well, respectively, and also selectively doping to a second impurity of a conduction type opposite to that of said first impurity, to another portion of said first polycrystalline semiconductor layer on said second conduction type well and on another portion of said bipolar transistor section, respectively;

selectively removing a portion of said first polycrystalline semiconductor layer on said first conduction type well, said second conduction type well and on said another portion of said bipolar transistor section so as to partially expose said first insulating layer;

forming a second insulating layer on said first polycrystalline semiconductor layer and a portion of said first insulating layer respectively exposed in said first conduction type well, said second conduction type well and said bipolar transistor section;

over-etching said exposed portion of said first insulating layer by using said second insulating layer as a mask so that said first insulating layer under said first polycrystalline semiconductor layer is partially removed;

filling a polycrystalline semiconductor to a space formed under said first polycrystalline semiconductor layer as the result of said over-etching and then selectively removing said filled polycrystalline semiconductor so as to leave said filled polycrystalline semiconductor under said first polycrystalline semiconductor layer;

heating said substrate so that the impurities included in said first polycrystalline semiconductor layer are respectively diffused to said first conduction type well, said second conduction type well and said bipolar transistor section;

selectively doping impurity to only a portion of said bipolar transistor section which is not covered by said first polycrystalline semiconductor layer so that a base region is formed;

forming an oxide layer on said first conduction type well, said second conduction type well and said bipolar transistor section which are not covered by said first polycrystalline semiconductor layer so that said oxide layer formed on said first conduction type well and said second conduction type well forms a gate insulator;

selectively removing only said oxide layer on said bipolar transistor section which is not covered by said first polycrystalline semiconductor layer so that an area within said base region where an emitter region is to be formed is exposed;

depositing a second polycrystalline semiconductor layer including a predetermined conduction type of impurity, on said second insulating layer, said gate insualtor on each of said first conduction type well and said second conduction type well, and said emitter formation area in said bipolar transistor section; and

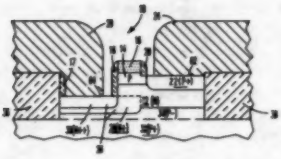
heating said substrate to cause said predetermined conduction type of impurity contained in said second polycrystalline semiconductor layer to be diffused to said emitter formation area in said bipolar transistor section so that an emitter region is formed in said bipolar transistor section.

4,957,875

VERTICAL BIPOLAR TRANSISTOR

Shah Akbar, Ithaca, N.Y.; Patricia L. Kroesen, Wallpole, Mass.; Seiki Ogura, Hopewell Junction, and Nivo Rovedo, Lagrangeville, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 1, 1988, Ser. No. 226,738
Int. Cl.[5] H01L *21/28*
U.S. Cl. 437—31 5 Claims



1. A method for forming a vertical bipolar transistor, comprising the steps of:

obtaining a structure comprising a collector layer of doped semiconductor material, a base layer of doped semiconductor material disposed over said collector layer, an emitter layer of doped semiconductor material disposed over said base layer, a step of insulating material disposed over a first portion of the top surface of said emitter layer, but not over a second portion thereof, and a subcollector disposed below said collector layer in the region below said second portion of said top surface of said emitter layer;

forming a sideway spacer of insulating material against the sidewall of said step to thereby cover a third portion of the top surface of said emitter layer, which third portion is less than said second portion;

removing said emitter layer and at least a nominal portion of said base layer in a first volume adjacent to said sidewall spacer;

removing said step;

removing said emitter layer and at least a nominal portion of said base layer in a second volume below said removed step to expose said base layer and to provide a base contact surface, and also removing additional material in said first volume in order to expose a collector contact surface in said collector layer or said subcollector which is lower relative to said base contact surface;

removing said sidewall spacer;

forming simultaneously a first insulator sidewall in said first volume adjacent to and in contact with one side of said emitter layer, base layer and at least a nominal portion of said collector layer and touching said collector contact surface, and a second insulator sidewall in said second volume adjacent to and in contact with another side of said emitter layer and at least a nominal portion of said base layer, and touching said base contact surface; and

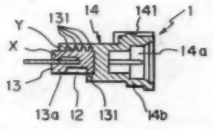
forming a collector contact interconnect on surface and forming a base contact interconnect on the top surface of said exposed base contact surface, with said collector and base contact interconnects being separated from said emitter layer by only one or more insulator layers.

4,957,876

RESIN SEALED SEMICONDUCTOR DEVICE AND A METHOD FOR MAKING THE SAME

Hiroshi Shibata; Fuyuki Maehara, both of Kariya; Akira Shintai, Chita, and Hidetoshi Kato, Suzuka, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Division of Ser. No. 201,757, Jun. 3, 1988, Pat. No. 4,899,209.
This application Jan. 17, 1990, Ser. No. 466,655
Claims priority, application Japan, Jun. 5, 1987, 62-142043; Apr. 30, 1988, 63-108520
Int. Cl.[5] H01L *21/64*
U.S. Cl. 437—209 15 Claims



1. A method of producing a resin molded IC regulator comprising:

forming a lead frame, in which at least a first connecting terminal electrically connected to an electrical load and a second connecting terminal electrically connected to a device other than said electrical load are connected to a frame portion thereof, out of a plate made of an electric conductive material,

mounting a monolithic IC controlling an operation of said electrical load on a conductive member and electrically connecting said monolithic IC to said lead frame,

completely sealing said monolithic IC mounted on said conductive member and partially sealing at least a portion of said first and second connecting terminals electrically connected to said monolithic IC, with a first resin having an electrical insulating characteristic to make a first molded portion, so that said first and second connecting terminals are rigidly fixed thereby,

separating said frame portion from said lead frame and

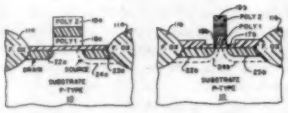
making a second molded portion by an externally covering molding operation to cover at least a portion of said first molded portion and surround said second connecting terminal in such a way that said second connecting terminal is disposed inside a cavity provided on said second molded portion, with a second resin having an electric insulating characteristic.

4,957,877

PROCESS FOR SIMULTANEOUSLY FABRICATING EEPROM CELL AND FLASH EPROM CELL

Simon M. Tam, Redwood City, and Stefan K. C. Lai, Belmont, both of Calif., assignors to Intel Corporation, Santa Clara, Calif.

Filed Nov. 21, 1988, Ser. No. 274,420
Int. Cl.[5] H01L *21/70*
U.S. Cl. 437—43 13 Claims



11. In the fabrication of a first electrically erasable programmable read-only memory cell on a substrate simultaneously with a second electrically programmable and electrically erasable memory cell formed on said substrate where said second

cell has a floating gate finger disposed over a thin oxide region from which charge is tunneled through said oxide region into a doped region formed in said substrate under a portion of said floating gate finger, improved processing for forming said doped region comprising the steps of:

doping said substrate adjacent to said floating gate finger of said second cell with at least one dopant;

driving the dopant under said floating gate finger thereby forming a pair of spaced-apart doped regions for facilitating the tunnelling of said charge.

4,957,878

REDUCED MASK MANUFACTURE OF SEMICONDUCTOR MEMORY DEVICES

Tyler A. Lowrey, and Randal W. Chance, both of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.

Filed May 2, 1988, Ser. No. 189,411

The portion of the term of this patent subsequent to Oct. 3, 2006, has been disclaimed.

Int. Cl.[5] H01L *21/26*

U.S. Cl. 437—52 **3 Claims**

1. Method of forming semiconductor circuit memory devices which include, as a part of each device, a plurality of memory cells and active circuit elements to control signals, the cells and active circuit elements forming a repeating pattern on the device, the method comprising:

(a) preparing a silicon wafer and establishing the wafer as a substrate;

(b) forming an initial oxide on the wafer;

(c) establishing buried contact of rings in the initial oxide;

(d) deposit a polysilicon layer on said initial oxide layer and buried contact openings, and patterning said polysilicon layer to simultaneously form gate electrodes and bitlines connected to substrate through the buried contact openings;

(e) applying a second oxide layer over the gate electrodes and bitlines;

(f) applying a third oxide layer on the second oxide layer;

(g) anisotropically etching the second and third oxide layers to form oxide sidewall spacers on the gate electrodes while leaving an oxide layer on top portions of said gate electrodes;

(h) forming capacitor plates after said anisotropic etch;

(i) forming electrical connections between the various device regions.

4,957,879

METHOD OF MAKING A SEMICONDUCTOR LASER USING SUPERLATTICE DISORDERING

Etsuji Omura; Katsuhiko Goto; Shogo Takahashi; Harumi Namba, and Akira Takemoto, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 304,806, Jan. 31, 1989, Pat. No. 4,888,781. This application Sep. 22, 1989, Ser. No. 410,896

Claims priority, application Japan, Feb. 2, 1988, 63-23554

Int. Cl.[5] H01L *21/20, 21/203*

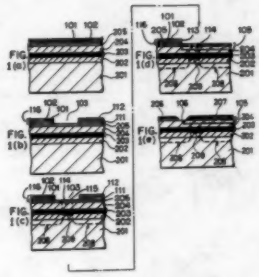
U.S. Cl. 437—129 **14 Claims**

1. A method of producing a buried heterojunction semiconductor laser, which comprises the steps of:

(a) successively depositing a lower cladding layer, a quantum well active layer, and an upper cladding layer of a given conductivity type on a semiconductor substrate to form a heterostructure;

(b) disordering regions of said active layer to define a non-disordered central stripe, by conducting from above said upper cladding layer, solid phase diffusion of impurities of a conductivity type opposite that of the upper cladding layer, the solid phase diffusion also serving to invert the conductivity type of a portion of the upper cladding layer;

(c) re-inverting the conductivity type, previously obtained during said solid phase diffusion process, of a portion of the surface of the inverted upper cladding layer, to the original conductivity type of the upper cladding layer to form a re-inverted region in electrical contact with the portion of the upper cladding layer located above said central stripe;



(d) forming p and n electrodes on top of corresponding conductivity type areas of the upper cladding layer to establish a conductive path through said areas to the central stripe.

4,957,880

METHOD FOR PRODUCING SEMICONDUCTOR DEVICE INCLUDING A REFRACTORY METAL PATTERN

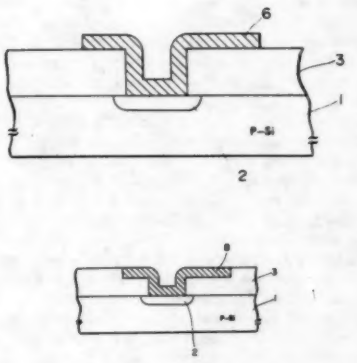
Hitoshi Itoh, Mitaka, and Takahiko Moriya, Yokosuka, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation-in-part of Ser. No. 150,437, Feb. 1, 1988, abandoned, which is a continuation of Ser. No. 866,249, May 23, 1986, abandoned. This application Apr. 28, 1989, Ser. No. 346,359

Claims priority, application Japan, May 29, 1985, 60-116275

Int. Cl.[5] H01L *21/283, 21/268*

U.S. Cl. 437—192 **6 Claims**



1. A method of forming a refractory metal pattern selectively on an insulating layer on a substrate comprising the steps of:

irradiating, in a hydrogen gas free atmosphere comprising a refractory metal halide gas, on a region of said insulating layer selectively by light having a wavelength in a range of from about 200 to about 1000 nm, and

depositing the refractory metal pattern selectively on said light-irradiated region of said insulating layer by a chemi-

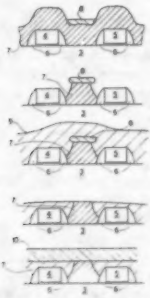
cal vapor deposition (CVD) method without irradiation using a gas mixture comprising the refractory metal halide gas and hydrogen gas.

4,957,881

FORMATION OF SELF-ALIGNED CONTACTS

Pier L. Crotti, Landriano, Italy, assignor to SGS-Thomson Microelectronics s.r.l., Italy

Filed Oct. 20, 1989, Ser. No. 424,450
Claims priority, application Italy, Oct. 20, 1988, 83673 A/88
Int. Cl.[5] H01L *23/522*
U.S. Cl. 437—195 **1 Claim**



1. A process for forming self-aligned metal-semiconductor contacts in MISFET type integrated structures which determine, during fabrication, a superficial morphology characterized by the presence of substantially parallel gate lines of a first conducting metallic material provided on the sides thereof with tapered lateral spacers of a dielectric material over the surface of a wafer of a monocrystalline semiconductor material, comprising:

(a) conformably depositing over said surface of the wafer a matrix layer of a second metallic material with a thickness sufficient for the bottom of valleys of said conformably deposited metal layer between two adjacent gate lines to be at a level higher than the level of peaks of said gate lines;

(b) depositing a layer of a planarization material over said conformably deposited matrix metallic layer;

(c) masking and etching said planarization material until exposing the peaks of said conformably deposited matrix metallic layer and leaving a residual layer of planarization material on the bottom of said valleys for a length defined by the mask;

(d) selectively etching said second metallic material using said residual layer of planarization material on the bottom of said valleys as a mask until lowering the etch edge of said second metallic material layer conformably deposited to an intermediate level down the flank of said tapered lateral spacers of dielectric material on the sides of said gate lines of said first metallic material;

(e) depositing a layer of dielectric material for insulating the residue of said second metallic material under each masking residue of said planarization material;

(f) etching said insulating layer of dielectric material and said masking residue of planarization material until exposing the peaks of said residues of said second metallic mateerial; and

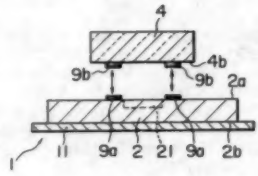
(g) depositing a third layer of metallic material in electrical continuity with said residue of said second metallic material through the exposed peaks thereof.

4,957,882

METHOD FOR MANUFACTURING SEMICONDUCTOR DEVICE

Kohji Shinomiya, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Mar. 8, 1989, Ser. No. 320,498
Claims priority, application Japan, Nov. 25, 1988, 63-295996
Int. Cl.[5] H01L *23/15, 31/203*
U.S. Cl. 437—209 **8 Claims**



1. A method for manufacturing a semiconductor device having a semiconductor chip with a light receiving element disposed in a surface of said semiconductor chip and a light transmission window for protecting said light receiving element, said light transmission window having a first surface facing said light receiving element and a second surface generally parallel to said first surface, said method comprising:

applying a first of first and second liquid agents comprising a two-part adhesive to a surface of a semiconductor chip in which is disposed a light receiving element to surround said light receiving element with said first liquid agent;

applying the second of said liquid agents of said two-part adhesive to a first surface of a light transmission window at a location corresponding to the first of said liquid agents as applied to said semiconductor chip;

fixing said semiconductor chip and said light transmission window to each other by bringing said first and second liquid agents into contact with each other; and

molding said semiconductor chip in a resin without obscuring said second surface of said light transmission window with the resin.

4,957,883

OXYNITRIDE GLASS AND THE FIBER THEREOF

Junya Kobayashi, Osaka; Masaaki Oota, Fukui; Katsuhiko Kada, and Hiroyoshi Minakuchi, both of Koyto, all of Japan, assignors to Shimadzu Corporation, Kyoto, Japan

Continuation-in-part of Ser. No. 190,385, May 5, 1988, abandoned. This application Mar. 6, 1989, Ser. No. 319,484
Claims priority, application Japan, May 28, 1987, 62-132860; May 28, 1987, 62-132861; Sep. 7, 1987, 62-223391
Int. Cl.[5] C03C *13/00, 3/062, 3/11*
U.S. Cl. 501—35 **8 Claims**

1. An oxynitride glass which has Si—M_1—M_2—O N system and contains SiO_2, Si_3N_4 and M_1O in amounts which, as mole %, satisfy the following equations (a) and (b):

$$(SiO_2+3Si_3N_4+M_1O)\times 100/(100+2Si_3N_4)=65 \text{ to less than } 100 \quad (a)$$

$$(SiO_2+3Si_3N_4)/M_1O=0.7 \text{ to } 2.3 \quad (b)$$

wherein M_1 is Ca, or Ca and Mg; M_2 is at least one of the metals selected from the group consisting of Al, Sr, La, Ba, Y, Ti, Zr, Ce, Na, K, Sb, B, Cr, Pb, V and Sn, said glass containing 0–40 mole % SiO_2, 26–70 mole % CaO, 0–20 mole % MgO, 15–30 at % N_2 and over O to not more than 22 at % M_2.

4. An oxynitride fiber which has Si—M_1—M_2—O—N system and contains SiO_2, Si_3N_4 and M_1O in amounts which, as mole %, satisfy the following equation (a) and (b):

$(SiO_2+3Si_3N_4+M_1O)\times 100/(100+2Si_3N_4)=65$ to less than 100 (a)

$(SiO_2+3Si_3N_4)/M_1O=0.7$ to 2.3 (b)

wherein M_1 is Ca, or Ca and Mg; M_2 is at least one of the metal selected from the group consisting of Al, Sr, La, Ba, Y, Ti, Zr, Ce, Na, K, Sb, B, Cr, Pb, V and Sn, said glass containing 0–40 mol % SiO_2, 26–70 mole % CaO, 0–20 mole % MgO, 15–30 at % N_2 and over O to not more than 22 at % M_2.

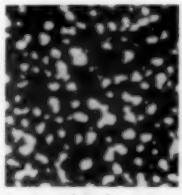
4,957,884
TITANIUM DIBORIDE/BORON CARBIDE COMPOSITES WITH HIGH HARDNESS AND TOUGHNESS

Arne K. Knudsen, and William Rafaniello, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 43,080, Apr. 27, 1987, abandoned. This application Apr. 15, 1988, Ser. No. 181,852

Int. Cl.[5] C04G *35/52*

U.S. Cl. 501—87 **18 Claims**



5 MICRONS

1. A powder composition consisting essentially of an intimate mixture of from more than 1 to about 99 weight percent boron carbide and from about 1 to less than 99 weight percent titanium diboride, the mixture having an average particle diameter of less than about 0.5 micron, the particles being uniformly dispersed such that electron probe analysis X-ray maps show substantially all discrete concentrations of boron carbide and titanium diboride to be less than or equal to about 0.5 micron in diameter.

4,957,885
PROCESS FOR MAKING A SILICON CARBIDE COMPOSITION

George T. Hida, Tonawanda, N.Y., assignor to Benchmark Structural Ceramics Corporation, Amherst, N.Y.

Continuation-in-part of Ser. No. 254,175, Oct. 6, 1988. This application Apr. 14, 1989, Ser. No. 339,137

The portion of the term of this patent subsequent to Aug. 14, 2007, has been disclaimed.

Int. Cl.[5] C04B *35/56*

U.S. Cl. 501—89 **16 Claims**

1. A process for preparing a composite material comprised of silicon carbidem comprising the steps of sequentially:

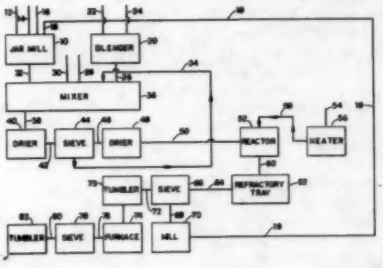
(a) providing a composite material comprised of from about 39 to about 54 percent of alpha silicon carbide and from about 46 to about 33 percent of alpha alumina, provided that least about 85 percent of such composite material is selected from the group consisting of alpha silicon carbide, alpha alumina, and mixtures thereof, wherein at least about 80 percent of such silicon carbide is comprised of silicon carbide whiskers;

(b) raising the temperature of said material to a temperature of from about 350 to about 500 degrees centrigrade at a rate of from about 15 to about 30 degrees per minute while subjecting said material to a pressure of less than about 150 millTorr;

(c) maintaining said material at said temperature of from about 350 to about 500 degrees centigrade for at least about 5 minutes while subjecting said material to a pressure of less than about 150 milliTorr;

(d) raising said material from said temperature of from about 350 to about 500 degrees centigrade to a temperature of from about 1,250 to about 1,350 degrees centigrade at a rate of from about 15 to about 25 degrees per minute while blanketing said material with an atmosphere which consists of inert gas;

(e) subjecting said material to said temperature of from about 1,250 to about 1,350 degrees centigrade and a pressure of from about 5 to about 15 pounds per square inch for a period of at least about 30 minutes while blanketing said material with an atmosphere consisting of inert gas;



(f) raising the temperature of said material to from about 1,650 to about 1,750 degrees centrigrade at a rate of from about 7 to about 15 degrees per minute while subjecting said material to a pressure of from about 5 to about 15 pounds per square inch and while blanketing said material with an atmosphere consisting of inert gas;

(g) subjecting said material to said temperature of from about 1,650 to about 1,750 degrees degrees centrigrade for from about 30 to about 90 minutes while subjecting said material to a pressure of from about 5 to about 15 pounds per square inch and while blanketing said material with an atmosphere consisting of inert gas; and

(h)thereafter cooling said material.

4,957,886
ALUMINUM OXIDE/ALUMINUM OXYNITRIDE/GROUP IVB METAL NITRIDE ABRASIVE PARTICLES DERIVED FROM A SOL-GEL PROCESS

James P. Mathers; William P. Wood, and Thomas E. Forester, all of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 183,478, Apr. 15, 1988, Pat. No. 4,855,264, which is a continuation of Ser. No. 932,941, Nov. 20, 1986, abandoned. This application Apr. 21, 1989, Ser. No. 341,802

Int. Cl.[5] C04B *35/58, 35/10*

U.S. Cl. 501—96 **17 Claims**

1. A method of preparing a ceramic abrasive particle comprising the steps of Method I:

Method I

(a) preparing a mixed sol consisting essentially of an alumina precursor, carbon or chemical precursor thereof, at least one of Periodic Group IVB metal oxides or chemical precursors thereof, a water soluble organic compound as carbon stabilizing agent, and alpha-alumina as seeding agent, said components being present in proportions sufficient to provide a ceramic abrasive particle consisting essentially of

(1) 1 to 99 volume percent alumina oxide,

(2) 1 to 99 volume percent gamma-aluminum oxynitride, and

(3) more than 0 up to 50 volume percent of at least one of Periodic Group IVB metal nitrides,

(b) gelling said mixed sol,
(c) drying said resulting gelled sol to provide brittle granules,
(d) optionally, crushing and sieving said granules to provide sized granules,
(e) calcining said granules at a temperature of about 1400° C. in a nitrogen atmosphere to remove volatile constituents,
(f) reaction sintering said calcined granules in a nitrogen atmosphere at a temperature of at least 1600° C. to provide the ceramic abrasive particle.

4,957,887

MAGNESITE-CARBON REFRACTORIES

David J. Michael, White Oak; David A. Kirk, and Leigh F. Brooks, both of Pittsburgh, all of Pa., assignors to Dresser Industries, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 274,387, Nov. 21, 1988. This application Mar. 22, 1990, Ser. No. 497,428
Int. Cl.[5] C04B *35/04, 35/54*
U.S. Cl. 501—101 31 Claims

1. A mix for forming a magnesite-carbon refractory comprising from about 8 to 30 wt.% of a high purity carbon consisting of 0–4 wt.% carbon black and the balance graphite, about 0.1 to 1 wt.% of aluminum metal, magnesium metal, or a mixture thereof, and the balance a high purity magnesite, and a carbonaceous bonding agent in an amount sufficient to bond the mix; said magnesite containing at least about 98% MgO and containing less than about 0.03% boron oxide, less than about 0.3% silica, and having a CaO/SiO_2 weight ratio above about 2, and said graphite having a loss on ignition of at least about 98%.

4,957,888

METHOD OF MANUFACTURING CERAMIC POWDERS HAVING THE PEROVSKITE STRUCTURE

Hans-Wolfgang Brand; Detlef F. K. Hennings, both of Aachen; Mareike K. Klee, Hückelhoven-Brachelen, and Herbert J. Scheinemacher, Aachen, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 10, 1988, Ser. No. 230,647
Claims priority, application Fed. Rep. of Germany, Aug. 17, 1987, 3727396
Int. Cl.[5] C04B *35/46, 35/48*
U.S. Cl. 501—134 12 Claims

1. A method of manufacturing a ceramic powder having the perovskite structure, said method comprising forming an aqueous solution consisting essentially of water and at least one alkaline earth metal salt and at least one salt of at least one metal selected from the group consisting of zirconium and titanium, adding a strong organic base, said base being an amine, to said solution to thereby form an aqueous suspension of said salts, heating said suspension at temperatures of from 70° C. to 150° C. to form a powder reaction product, separating out the resultant powder reaction product from said suspension and then removing any water adhering to said separated powder reaction product.

4,957,889

STABLE INTERCALATED CLAYS AND PREPARATION METHOD

John R. McCauley, Louisville, Md., assignor to UOP, Des Plaines, Ill.

Continuation-in-part of Ser. No. 21,972, Mar. 5, 1987, Ser. No. 154,834, Feb. 26, 1988, and Ser. No. 275,719, Nov. 23, 1988. This application Jan. 31, 1989, Ser. No. 304,319
Int. Cl.[5] B01J *29/04, 21/16, 23/10*
U.S. Cl. 502—65 21 Claims

1. Hydrothermally-stable composition comprising an oligomer or polymer of (a) at least one pillaring metal, (b) at least one rare earth element, at least one of (c) oxygen, (d) and a halogen.

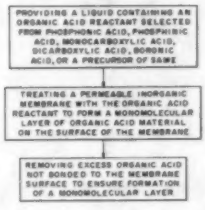
18. A catalyst comprising: (i) the composition of claim 1 as the support; and (ii) a catalytically active metal on said support and/or in the pores of said support.

4,957,890

SURFACE TREATED PERMEABLE INORGANIC MEMBRANES AND METHOD OF MAKING SAME

Larry F. Wieserman; Karl Wefers, both of Apollo; Kathryn Cross, Murrysville; Edward S. Martin, New Kensington; H. Philip Hsieh, and William H. Quayle, both of Murrysville, all of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 23,423, Mar. 9, 1987, Pat. No. 4,788,176, which is a continuation-in-part of Ser. No. 946,870, Dec. 29, 1986, abandoned. This application Oct. 31, 1988, Ser. No. 265,241
The portion of the term of this patent subsequent to Nov. 29, 2005, has been disclaimed.
Int. Cl.[5] B01D *71/06, 71/02;* B01J *20/28, 20/22*
U.S. Cl. 502—4 25 Claims


PROVIDING A LIQUID CONTAINING AN ORGANIC ACID REACTANT SELECTED FROM PHOSPHONIC ACID, PHOSPHINIC ACID, MONOCARBOXYLIC ACID, DICARBOXYLIC ACID, BORONIC ACID, OR A PRECURSOR OF SAME
TREATING A PERMEABLE INORGANIC MEMBRANE WITH THE ORGANIC ACID REACTANT TO FORM A MONOMOLECULAR LAYER OF ORGANIC ACID MATERIAL ON THE SURFACE OF THE MEMBRANE
REMOVING EXCESS ORGANIC ACID NOT BONDED TO THE MEMBRANE SURFACE TO ENSURE FORMATION OF A MONOMOLECULAR LAYER

1. A treated permeable inorganic membrane having a monomolecular layer of an organic material thereon and formed by treating the surface of a permeable inorganic membrane having oxide/hydroxide reactive sites with an organic acid to bond an acid group of the organic acid to the oxide/hydroxide sites on the membrane, the organic acid selected from the group consisting of:
(a) phosphoric acid having the formula $RPO(OH)_2$;
(b) phosphinic acid having the formula $RR'PO(OH)$; and
(c) one or more precursors of the foregoing acids which decompose to form the acid functionality; where R comprises a 1–30 carbon-containing group, R' comprises hydrogen or a 1–30 carbon-containing group; and R'' comprises a 2–30 carbon-containing group wherein excess organic acid material not bonded to the underlying membrane surface is removed.

4,957,891

CATALYST FOR ISOMERIZING ALKYLAROMATICS

Johann W. A. Sachtler, Des Plaines; Randy J. Lawson, Palatine, and Susan L. Lambert, Rolling Meadows, all of Ill., assignors to UOP, Des Plaines, Ill.

Continuation-in-part of Ser. No. 281,424, Dec. 8, 1988, Pat. No. 4,886,927, Division of Ser. No. 109,019, Oct. 16, 1987, abandoned. This application Dec. 11, 1989, Ser. No. 448,445
Int. Cl.[5] B01J *29/28*
U.S. Cl. 502—61 4 Claims

1. A catalyst for the isomerization of a non-equilibrium C_8-aromatic mixture containing xylenes and ethylbenzene comprising at least one platinum group metal and a gallium-substituted pentasil zeolite having a ZSM-5 structure in a zirconia-alumina matrix containing from about 1 to 10 wt. % zirconia, the catalyst having a matrix/zeolite weight ratio of 9:1 to 19:1.

4,957,892

PROCESS FOR COMBUSTING SOLID SULFUR CONTAINING MATERIAL

Jin S. Yoo, Flossmoor, and John A. Jaecker, Homewood, both of Ill., assignors to UOP, Des Plaines, Ill.

Division of Ser. No. 940,619, Dec. 11, 1986, Pat. No. 4,758,418, which is a division of Ser. No. 692,448, Jan. 16, 1985, Pat. No. 4,642,178, which is a division of Ser. No. 494,604, May 16, 1983, Pat. No. 4,995,304, which is a continuation-in-part of Ser. No. 301,678, Sep. 14, 1981, abandoned, which is a continuation-in-part of Ser. No. 173,315, Jul. 29, 1980, abandoned. This application Apr. 7, 1988, Ser. No. 178,629
The portion of the term of this patent subsequent to Jan. 22, 2002, has been disclaimed.
Int. Cl.[5] B01J *29/00*
U.S. Cl. 502—63 29 Claims

1. A composition of matter comprising, in intimate admixture, a major amount of solid particles capable of promoting hydrocarbon conversion at hydrocarbon conversion conditions, said solid particles including at least one crystalline aluminosilicate capable of promoting said hydrocarbon conversion, and a minor amount of discrete entities having a composition different from said solid particles and comprising at least one metal-containing spinel which includes a first metal and at least two different second metals having valences higher than the valence of said first metal, one of said second metals being aluminum, and the other of said second metals being trivalent and selected from the group consisting of iron, chromium, vanadium, manganese, gallium, boron, cobalt and mixtures thereof, the atomic ratio of said first metal to said second metals in said spinel being at least about 0.17 and said spinel having a surface area in the range of about 25 m^2/gm. to about 600 m^2/gm.

4,957,893

CATALYST FOR MAKING AMINES FROM ALCOHOLS

Pak Y. Fong; Kim R. Smith, and Joe D. Sauer, all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Division of Ser. No. 133,733, Dec. 16, 1987, which is a continuation-in-part of Ser. No. 22,095, Mar. 5, 1987, abandoned, which is a continuation-in-part of Ser. No. 22,047, Mar. 5, 1987, abandoned, which is a continuation-in-part of Ser. No. 79,522, Jul. 30, 1987, abandoned. This application Jun. 12, 1989, Ser. No. 365,213
Int. Cl.[5] B01J *23/02, 23/06, 23/72, 27/232*
U.S. Cl. 502—174 12 Claims

1. A non-colloidal catalyst suitable for catalyzing the reaction of a mono- or di-lower alkylamine with an alkanol thereby alkylating said amine, said catalyst consisting essentially of supported or unsupported copper oxide, zinc oxide, and an alkaline earth metal base selected from the group consisting of barium oxide, barium hydroxide, barium carbonate, calcium hydroxide, calcium carbonate, magnesium hydroxide, magnesium carbonate, and mixtures thereof.

4,957,894

PROCESS FOR MANUFACTURE OF MALEIC ANHYDRIDE CATALYSTS

Muin S. Haddad, and William S. Eryman, both of Naperville, Ill., assignors to Amoco Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 225,523, Jul. 28, 1988, abandoned. This application Jul. 28, 1989, Ser. No. 387,001
Int. Cl.[5] B01J *27/198, 37/28;* C07D *307/34*
U.S. Cl. 502—209 15 Claims

1. A process for the manufacture of a catalyst that is suitable for use in the manufacture of maleic anhydride from butane, said catalyst comprising a phosphorus-vanadium mixed oxide, which process comprises reacting in a reaction zone at a temperature of about 0° C. (32° F.) to about 200° C.) a vanadium compound in an organic ether solvent having bout 2 to about 10 carbon atoms with a phosphoryl halide in the presence of water or an aliphatic alcohol having from about 1 to about 8 carbon atoms, said reacting being carried out by adding said phosphoryl halide to said vanadium compound in said organic ether solvent and forming a reaction mixture refluxing said reaction mixture, introducing an oxygen-containing gas into said reaction mixture du ing said reacting sand said refluxing in an amount and at a rate that are sufficient to provide a first atmosphere comprising at least about 0.1 weight percent oxygen, forming a thick syrup, and drying said syrup in a drying zone in a second oxygen-containing atmosphere to form a solid catalytic material, said second atmosphere being maintained by introducing into said drying zone an oxygen-containing gas in an amount and at a rate that are sufficient to provide an atmosphere comprising at least about 0.1 weight percent oxygen.

4,957,895

HYDROTREATING CATALYST AND PROCESS

Eugene Nebesh, Parma; Robert A. Plundo, Hudson, and Steven L. McMahon, Macedonia, all of Ohio, assignors to The Harshaw Chemical Company, Edison, N.J.

Filed May 23, 1988, Ser. No. 197,455
Int. Cl.[5] B01J *27/12*
U.S. Cl. 502—228 32 Claims

1. A hydrotreating catalyst comprising at least one Group VI metal, metal oxide, or metal sulfide, or mixtures thereof, and at least one Group VIII metal, metal oxide, or metal sulfide, or mixtures thereof, supported on a carrier wherein

(A) the catalyst comprises from about 10% to about 35% by weight of combined metal, and the atomic ratio of the Group VIII metal to Group VI metal is in the range of from about 0.5:1 to about 2:1;

(B) the carrier comprises from about 0.5 to about 10 weight percent of halogen, from about 0.5 to about 5% by weight of silica, and from about 85 to about 99% of alumina; and

(C) the catalyst is characterized as having a median pore radius of from about 30 to about 65 Angstroms, and a surface area of from about 115 to about 180 m^2/g.

4,957,896

CATALYST FOR PURIFICATION OF EXHAUST GASES

Shinichi Matsumoto; Toru Tanaka, both of Aichi; Yutaka Ishikawa; Shinji Matsuura, both of Shizuoka; Hirofumi Shinjoh, and Masakuni Ozawa, both of Aichi, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha Cataler Industrial Co. Ltd and Kabushiki Kaisha Toyota Chuo Kenkusho, both of, Japan

Filed Mar. 15, 1989, Ser. No. 323,691
Claims priority, application Japan, Mar. 24, 1988, 63-70214
Int. Cl.[5] B01J *21/04, 21/06, 23/10, 23/40*
U.S. Cl. 502—304 8 Claims

1. A catalyst for purification of exhaust gases comprising:

a support substrate;

an active alumina coating layer comprising at least one of nickel oxide and cobalt oxide formed on the surface of said support substrate;

a composite oxide consisting essentially of cerium oxide and zirconium oxide formed in said active alumina coating layer; and

a noble metal catalyst component comprising at least one of platinum, palladium and rhodium loaded on said active alumina coating layer.

4,957,897

CARBONACEOUS ADSORBENTS FROM PYROLYZED POLYSULFONATED POLYMERS

Stephen G. Maroldo, Harleysville; William R. Betz, Port Matilda, and Noah Borenstein, Oreland, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 150,183, Jan. 29, 1988, Pat. No. 4,839,331. This application Feb. 7, 1989, Ser. No. 307,554
Int. Cl.[5] B01J *20/30, 20/20, 39/24;* C01B *31/10*
U.S. Cl. 502—432 18 Claims

1. A process for preparing carbonaceous adsorbent particles which comprises pyrolyzing, at a temperature from about 300°

C. to about 1200° C., particles of a polysulfonated macroporous, crosslinked, vinylaromatic polymer having multimodal pore-size distribution to a minimum micropore volume of about 0.02 cm^3/g.

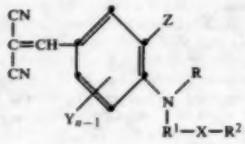
4,957,898

MIXTURE OF YELLOW AND MAGENTA DYES TO FORM A RED HUE FOR COLOR FILTER ARRAY ELEMENT

Helmut Weber, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 18, 1989, Ser. No. 340,103
Int. Cl.[5] B41M *5/035, 5/26*
U.S. Cl. 503—227 **20 Claims**

1. A thermally-transferred color filter array element comprising a transparent support having thereon a thermally transferred image comprising a repeating mosaic pattern of colorants in a receiving layer, one of said colorants being a mixture of a yellow dye and a magenta dye to form a red hue, said yellow dye having the formula:



I

wherein

R is a substituted or unsubstituted alkyl group of from 1 to about 10 carbon atoms; a cycloalkyl group of from about 5 to about 7 carbon atoms; or represents the atoms which when taken together with Z forms a 5- or 6-membered ring;

R^1 is an alkylene or substituted alkylene group;

X is —OJO—, —OJ—, —JO—, —OJNR[3]—, —NR[3]J—, —NR[3]JNR[3], —JNR[3]— or —NR[3]JO—;

J is CO or SO_2;

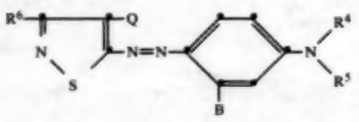
R^3 is hydrogen; a substituted or unsubstituted alkyl group of from 1 to about 10 carbon atoms; a substituted or unsubstituted aryl group of from about 6 to about 10 carbon atoms; or represents the atoms which when taken together with R^2 forms a 5- or 6-membered ring;

R^2 is a substituted or unsubstituted alkyl group of from 1 to about 10 carbon atoms; a cycloalkyl group of from about 5 to about 7 carbon atoms; a substituted or unsubstituted aryl group of from about 6 to about 10 carbon atoms; or represents the atoms which when taken together with R^3 forms a 5- or 6-membered ring;

Z is hydrogen or represents the atoms which when taken together with R forms a 5- or 6-membered ring;

Y is a substituted or unsubstituted alkyl or alkoxy group of from 1 to about 6 carbon atoms or halogen; and

n is a positive integer from 1 to 4; and said magenta dye having the formula:



II

wherein R^4 and R^5 may each independently be hydrogen, substituted or unsubstituted alkyl or allyl of from 1 to about 6 carbon atoms, substituted or unsubstituted cycloalkyl of from about 5 to about 7 carbon atoms, substituted or unsubstituted aryl of from about 5 to about 10 carbon atoms; or R^4 and R^5 may be taken together to form a ring; or a 5 or membered heterocyclic ring may be formed with R^4 or R^5, the nitrogen to which R^4 or R^5 is attached, and either carbon atom ortho to the carbon attached to said nitrogen atom;

R^6 may be may be hydrogen, substituted or unsubstituted alkyl of from 1 to about 6 carbon atoms, substituted or unsubstituted aryl of from about 5 to about 10 carbon atoms, alkylthio or halogen;

B may be substituted or unsubstituted alkyl of from 1 to about 6 carbon atoms, substituted or unsubstituted aryl of from about 5 to about 10 carbon atoms or NHA, where A is an acyl or sulfonyl radical; and

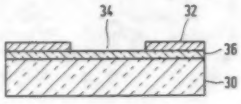
Q may be cyano, thiocyanato, alkylthio or alkoxycarbonyl.

4,957,899

METHOD OF PATTERNING SUPERCONDUCTING OXIDE THIN FILMS

Maritza G. J. Heijman, and Peter C. Zalm, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 219,519, Jul. 15, 1988, Pat. No. 4,900,709. This application Jan. 3, 1989, Ser. No. 292,676
Claims priority, application Netherlands, Jul. 21, 1987, 8701718
Int. Cl.[5] B05D *5/12;* **B32B** *33/00*
U.S. Cl. 505—1 **3 Claims**



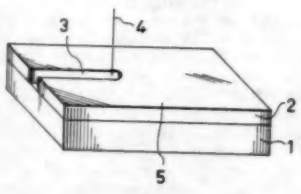
1. A method of forming a patterned copper oxide based superconductor on a substrate operable at a particular service temperature comprising providing a coating of a copper oxide based material on the substrate and then applying a thin layer of a composition on to the surface of the copper oxide based coating with a desired pattern, said composition is selected such that the copper oxide based material underlying said composition is rendered to be non-superconducting while the exposed copper oxide based material is rendered to be superconducting at the desired service temperature.

4,957,900

METHOD OF MANUFACTURING A SUPERCONDUCTING PATTERN BY LIGHT IRRADIATION

Shumpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Hase Atsugi, Japan

Filed Mar. 28, 1988, Ser. No. 174,503
Claims priority, application Japan, Apr. 7, 1987, 62-86494
Int. Cl.[5] H01L *39/12;* **B05D** *5/12*
U.S. Cl. 505—1 **13 Claims**



1. A method of manufacturing a superconducting ceramic pattern comprising:

forming a copper oxide-based superconducting ceramic precursor layer on a surface, said surface formed of a

material having a thermal coefficient of expansion of 50%–150% of that of said ceramic layer,

irradiating and subliming a portion of the ceramic layer with light to remove the irradiated portion, and

thermally annealing the remaining ceramic layer to render it superconducting.

4,957,901

METHOD OF MANUFACTURING AN OBJECT FROM SUPERCONDUCTIVE MATERIAL

Klas Jacobson, and Hakan Johansson, both of Västerås, Sweden, assignors to ASEA Brown Boveri AB, Sweden

Filed Sep. 14, 1988, Ser. No. 244,113

Claims priority, application Sweden, Sep. 17, 1987, 8703600-0

Int. Cl.[5] H01L *39/12*

U.S. Cl. 505—1 13 Claims

1. A method of manufacturing an object of a superconductive metallic oxide material comprising the steps of:

(a) providing a preformed body of a powdered material which can provide the superconductive metallic oxide material,

(b) enclosing the preformed body in a gas-tight casing which is made of a casing material which can transport oxygen, and

(c) forming the object by isostatically pressing the gas-tight casing with preformed body therein with a gaseous pressure medium and at a temperature sufficient to sinter the preformed body, the gaseous pressure medium comprising oxygen gas and another gas whose ability to penetrate the gas-tight casing is much lower than that of oxygen, the oxygen gas penetrating through the gas-tight casing to maintain a homogeneous oxygen content in the preformed body therein.

4,957,902

PEPTIDE INHIBITORS OF WOUND CONTRACTION

Frederick Grinnell, Dallas, Tex., assignor to Board of Regents, the University of Texas System, Austin, Tex.

Filed Dec. 20, 1988, Ser. No. 287,005

Int. Cl.[5] C07K *5/08, 7/06, 5/10*

U.S. Cl. 514—17 16 Claims

1. A method for inhibiting wound contraction in an individual having a wound, the method comprising the steps of:

providing a pharmaceutically acceptable composition including, as the active principle, a polypeptide compound having the sequence:

X—NH—Arg—Gly—Glu—CO—Y

1 2 3

wherein X is a pharmaceutically acceptable N terminal derivative, or is selected from the group consisting of Z—NH—Val, Z—NH—Gly—Val, Z—NH—Ala, Z—NH—Gly—Ala, Z—NH—Glu, Z—NH—Gly—Glu, Z—NH—Leu, Z—NH—Gly—Leu, Z—NH—Asp, Z—NH—Gly—Asp, Z—NH—Ser, Z—NH—Gly—Ser, Z—NH—Pro, Z—NH—Gly—Pro, Z—NH—Gln, Z—NH—Gly—Gln, and Z—NH—Gly, where Z is a pharmaceutically acceptable N-terminal derivative thereof,

wherein Y is a pharmaceutically acceptable C—terminal derivative, or is selected from the group consisting of —Hyp—CO—R, —Hyp—Gly—CO—R, —Gln—CO—R, —Gln—Gly—CO—R, —Arg—CO—R, —Arg—Gly—CO—R, —Thr—CO—R, —Thr—Gly—CO—R, —Ile—CO—R, —Ile—Gly—CO—R, —Ala—CO—R, —Ala—Gly—CO—R, —Val—CO—R, —Val—Gly—CO—R, —Ser—CO—R, and —Ser—Pro—CO—R, where R is a pharmaceutically acceptable C terminal derivative thereof; and

administering said pharmaceutically acceptable composition to an individual so that a wound being treated is exposed to a therapeutically effective amount thereof.

4,957,903

PHARMACEUTICAL AND CLINICAL COMPOSITIONS OF DESAA FIBRIN MONOMERS AND THE TETRAPEPTIDE GLY-PRO-ARG-PRO

Mats G. Ranby, Umeå, Sweden, assignor to Biopool International, Inc., New York, N.Y.

PCT No. PCT/SE86/00144, § 371 Date Nov. 20, 1986, § 102(e) Date Nov. 20, 1986, PCT Pub. No. WO86/05814, PCT Pub. Date Oct. 9, 1986

PCT Filed Mar. 27, 1986, Ser. No. 936,347

Claims priority, application Sweden, Apr. 1, 1985, 8501614

Int. Cl.[5] C07K *5/10*; C12Q *1/37*; A61K *37/18*

U.S. Cl. 514—18 43 Claims

1. A solubilizable, fibrin based composition, consisting of:

(a) approximately 0.1 to 20 mg/ml desAA-fibrin, and

(b) approximately 0.4 to 10 mg/ml of a peptide consisting of glycyl-L-prolyl-L-arginyl-L-proline,

wherein the peptide prevents polymerization of said desAA-fibrin, thus solubilizing said desAA-fibrin to form a stable, non-polymerizing composition.

4,957,904

PERFLUOROALKYLTHIOGLYCOSIDES

Robert A. Falk, New City, N.Y.; Kirtland P. Clark, Bethel, Conn., and Gregory R. Coughlin, Katonah, N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 286,553, Dec. 19, 1988, abandoned. This application May 18, 1989, Ser. No. 353,586

Claims priority, application Switzerland, May 24, 1988, 01963/88

Int. Cl.[5] A61K *31/00*; C07G *3/00*; C07H *15/00*; B01F *17/00*

U.S. Cl. 514—24 19 Claims

1. A compound of the formula

R_f-E-S-saccharide

wherein

R_f is a straight or branched chain perfluoroalkyl of 1 to 18 carbon atoms or said perfluoroalkyl substituted by perfluoroalkoxy of 2 to 6 carbon atoms;

E is branched or straight chain alkylene of 1 to 10 carbon atoms or said alkylene interrupted by up to three groups selected from the group consisting of —NR—, —O—, —S—, —SO_2—, —COO—, —OOC—, —CONR—,—NRCO—, —SO_2NR—, and —NRSO_2—, or is terminated at the R_f end with —CONR—or —SO_2NR—, where R_f is attached to the carbon or sulfur atom, and where R is independently hydrogen, alkyl of 1 to 6 carbon atoms or hydroxyalkyl of 2 to 6 carbon atoms; and

saccharide is a mono-, di-, or higher oligosaccharide comprising 1 to 30 units of a 5, 6, or 7 carbon-membered sugar or mixture thereof.

16. A stable, aqueous emulsion, useful as a synthetic blood substitute, which comprises

(a) a fluorochemical oxygen carrier, and

(b) an effective amount of a compound according to claim 1.

4,957,905

9-(N'-SUBSTITUTED HYDRAZONE) DERIVATIVES OF ERYTHROMYCINS

Eric Hunt, Betchworth, England, assignor to Beecham Group p.l.c., England

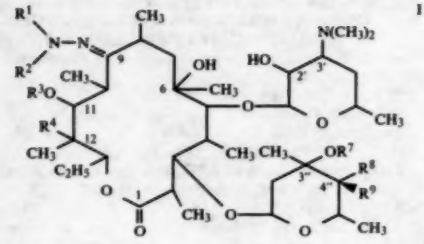
Filed Sep. 7, 1988, Ser. No. 241,902

Claims priority, application United Kingdom, Sep. 9, 1987, 8721165

Int. Cl.[5] A61K *31/70*; C07H *17/08*

U.S. Cl. 514—29 15 Claims

10. A method of treating bacterial infections in humans and animals which comprises administering to a human or animal in need thereof an antibacterially effective amount of a compound of the formula I, or a pharmaceutically acceptable ester or acid addition salt thereof



I

wherein

R^1 is hydrogen or alkyl of up to 6 carbon atoms;

R^2 is alkyl of 1 to 6 carbon atoms unsubstituted or substituted by heterocyclyl of 5 or 6 ring members, amino, alkanoylamino of 1 to 6 carbon atoms in the alkyl moiety, mono-, di or tri- alkylamino of 1 to 6 carbon atoms in each alkyl moiety, hydroxy, alkoxy of 1 to 6 carbon atoms, mercapto, alkylthio of 1 to 6 carbon atoms, heterocyclylthio of 5 or 6 ring members, phenylthio, sulphamoyl, carbamoyl, amidino, guanidino, nitro, chloro, bromo, fluoro, carboxy or a carboxyl salt or ester, alkanoyloxy of 1 to 6 carbon atoms in the alkyl moiety, phenylcarbonyloxy, heterocyclylcarbonyloxy of 5 or 6 ring members, acyl, alkenyl of 2 to 6 carbon atoms, alkynyl of 2 to 6 carbon atoms or phenyl or naphthyl; or R^2 is phenyl or naphthyl which is unsubstituted or substituted by up to three substituents selected from the group consisting of heterocyclyl of 5 or 6 ring members, amino, alkanoylamino of 1 to 6 carbon atoms in the alkyl moiety, mono-, di- or tri- alkylamino of 1 to 6 carbon atoms in each alkyl moiety, hydroxy, alkoxy of 1 to 6 carbon atoms, mercapto, alkylthio of 1 to 6 carbon atoms, heterocyclylthio of 5 or 6 ring members, phenylthio, sulphamoyl, carbamoyl, amidino, guanidino, nitro, chloro, bromo, fluoro, carboxy or a arboxyl salt or ester, alkanoyloxy of 1 to 6 carbon atoms in the alkyl moiety, phenylcarbonyloxy, heterocyclylcarbonyloxy of 5 or 6 ring members, acyl, halo, alkyl of 1 to 6 carbon atoms, pheayl, alkoxy of 1 to 6 carbon atoms, haloalkyl of 1 to 6 carbon atoms, hydroxy, amino, nitro, carboxy, alkoxycarbonyl of 1 to 6 carbon atoms, alkoxycarbonylalkyl of 1 to 6 carbon atoms in each of the alkoxy and alkyl moieties, alkanoyloxy of 1 to 6 carbon atoms in the alkyl moiety or alkanoyl of 1 to 6 carbon atoms in the alkyl moiety; or R^2 is heterocyclyl of 5 or 6 ring members;

R^3 is hydrogen;

R^4 is hydrogen or hydroxy;

or

R^1 and R^2 together are straight-chain alkylene or alkenylene of 3 to 6 carbon atoms; or

R^1 and R^3 together are methylene unsubstituted or substituted by alkyl of 1 to 6 carbon atoms, phenyl, naphthyl, furyl, pyranyl, thienyl, dihydropyranyl, or tetrahydrofuryl; or

OR^3 and R^4 together are carbonate; and

R^7 is hydrogen or methyl;

one of R^8 and R^9 hydrogen, hydroxy, alkoxy of 1 to 6 carbon atoms, alkanoyloxy of 1 to 6 carbon atoms in the alkoxy moiety, amino, or a group of the formula R^A—SO_2—O—, in which R^A is a hydrocarbon, oxahydrocarbon, thiahydrocarbon or azahydrocarbon wherein the hydrocarbon is alkyl of 1 to 6 carbon atoms, alkenyl of 2 to 6 carbon atoms, phenyl, nitrophenyl, halophenyl, alkylphenyl, benzyl, nitrobenzyl, alkylbenzyl, phenoxyalkyl, nitrophenoxyalkyl or R^G—CH_2CH_2— wherein R^G is amino, carbamoyl, sulphamoyl, alkoxy or alkylthio and wherein each of the above alkyl and alkoxy moieties is of 1 to 6 carbon atoms; and the other of R^8 and R^9 is hydrogen, or R^8 and R^9 together are oxo, oxime, or acetyloxime, in combination with a pharmaceutically acceptable carrier, in combination with a pharmaceutically acceptable carrier.

4,957,906

PHARMACEUTICAL COMPOSITIONS CONTAINING A DERIVATIVE OF PARA-AMINOBENZOIC ACID AS AN ACTIVE INGREDIENT

Chikao Yoshikumi, Tokyo; Yoshio Ohmura, Chiba; Fumio Hirose, Tokyo; Masanori Ikuzawa, Tokyo; Kenichi Matsunaga, Tokyo; Takayoshi Fujii, Tokyo; Minoru Ohhara, Tokyo, and Takao Ando, Tokyo, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 879,508, Jun. 27, 1986, abandoned, which is a continuation of Ser. No. 686,415, Dec. 26, 1984, abandoned, which is a continuation of Ser. No. 352,858, Feb. 26, 1982, Pat. No. 4,569,842, which is a division of Ser. No. 81,190, Oct. 2, 1979, Pat. No. 4,322,408. This application Feb. 26, 1988, Ser. No. 163,204

Claims priority, application Japan, Apr. 11, 1978, 53-42576; May 26, 1978, 53-63146; Dec. 29, 1978, 53-161385; Dec. 29, 1978, 53-161386

The portion of the term of this patent subsequent to Apr. 19, 2000, has been disclaimed.

Int. Cl.[5] A61K *31/70*

U.S. Cl. 514—42 **7 Claims**

1. A pharmaceutical composition for parenteral administration in dosage unit form comprising 0.1 to 100 mg/kg body weight/day of p-aminobenzoic acid-N-D-mannoside, or a pharmaceutically acceptable salt thereof, effective for the treatment of tumor, and a pharmaceutically acceptable carrier.

4,957,907

PROCESS FOR PREPARATION OF ALOE PRODUCTS

Bill H. McAnalley, Grand Prairie, Tex., assignor to Carrington Laboratories Inc., Irving, Tex.

Continuation of Ser. No. 144,872, Jan. 14, 1988, Pat. No. 4,851,224, which is a continuation-in-part of Ser. No. 869,261, Jun. 5, 1986, Pat. No. 4,735,935, which is a continuation-in-part of Ser. No. 810,025, Dec. 17, 1985, abandoned, which is a continuation-in-part of Ser. No. 754,859, Jul. 14, 1985, abandoned, which is a continuation-in-part of Ser. No. 750,321, Jun. 28, 1985, abandoned, which is a continuation-in-part of Ser. No. 649,967, Sep. 12, 1984, abandoned, which is a continuation of Ser. No. 375,720, May 7, 1982, abandoned. This application Jan. 25, 1989, Ser. No. 301,986

Int. Cl.[5] A61K *31/715*

U.S. Cl. 514—54 **11 Claims**

1. Process for extracting from the aloe plant a substantially non-degradable lypholized polymer of linear β (1→4)-D-mannosyl units wherein randomly interspersed acetyl groups are linked to the polymer through an oxygen atom and wherein D-galactopyranose is linked to the polymer through an α (2–6) linkage at a ratio of about one D-galactopyranose residue per seventy monomer units, comprising:

(a) washing an aloe leaf in a bacteriacidal solution to remove substantially all surface dirt and bacteria;

(b) removing at lest a first end portion from said washed leaf;

(c) removing rind and any remaining anthraquinone-rich sap from said leaf to produce a substantially anthraquinone-free aloe gel fillet;

(d) grinding and homogenizing said substantially anthraquinone-free aloe gel to produce substantially anthraquinone-free aloe juice having solubilized matter;

(e) filtering said ground and homogenized aloe juice to remove fibrous material;

(f) adjusting the pH of said aloe juice of from about 3.00 to about 3.50;

(g) adding a water-soluble, lower aliphatic polar solvent to the aloe juice to precipitate the active chemical substance and thereby to form a heterogeneous solution containing soluble contaminants;

(h) removing the water soluble, lower aliphatic polar solvent

and the solubilized matter from the heterogeneous solution to isolate the precipitated active chemical substance; and

(i) drying the precipitated active chemical substance.

4,957,908

CHITOSAN PYRITHIONE AS ANTIMICROBIAL AGENT USEFUL IN PERSONAL CARE PRODUCTS

John D. Nelson, Naugatuck, Conn., assignor to Olin Corporation, Cheshire, Conn.

Filed Jan. 8, 1990, Ser. No. 461,720

Int. Cl.[5] A61K *31/00*; C07D *211/00, 213/00*; C08B *37/00*

U.S. Cl. 514—55 5 Claims

4. The process of claim 3 wherein said chitosan pyrithione has a molecular weight of between about 150,000 and about 500,000.

4,957,909

BENZOBICYCLOALKANE DERIVATIVES AS ANTICONVULSANT NEUROPROTECTIVE AGENTS

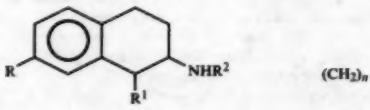
Magid A. Abou-Gharbia, Glen Mills, Pa., and Ronald R. Notvest, Jamesburg, N.J., assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 347,538, May 4, 1989, Pat. No. 4,924,008. This application Jan. 2, 1990, Ser. No. 459,874

Int. Cl.[5] A61K *31/66*

U.S. Cl. 514—75 7 Claims

1. A process for preventing convulsions and neurodegenerative disorders induced by overstimulation of excitatory amino acid receptors, which comprises administering to a mammal suffering from such convulsions or neurodegenerative disorders, an anticonvulsant, neuroprotective amount of an NMDA antagonist of the formula:



where

R is hydrogen, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, hydroxy, alkanoyloxy of 2 to 6 carbon atoms, phenylalkoxy having 1 to 6 carbon atoms in the alkoxy moiety, halo or trifluoromethyl;

R^1 is alkyl of 1 to 6 carbon atoms, alkenyl of 2 to 6 carbon atoms or phenylalkyl having 1 to 6 carbon atoms in the alkyl moiety;

R^2 is hydrogen, alkyl of 1 to 6 carbon atoms, phenylalkyl having 1 to 6 carbon atoms in the alkyl moiety, alkenyl of 2 to 6 carbon atoms, alkynyl of 2 to 6 carbon atoms, thienylalkyl having 1 to 6 carbon atoms in the alkyl moiety or furylalkyl having 1 to 6 carbon atoms in the alkyl moiety;

and

n is one of the integers 2, 3, 4, 5 or 6;

or a pharmaceutically acceptable salt thereof.

4,957,910

METHOD AND COMPOSITION FOR THE TREATMENT AND PREVENTION OF VIRAL INFECTIONS

Peter M. Sutton, Manderley; Anthony Atkinson, Twingley, and Graham Lloyd, East Gomeldon, all of England, assignors to Public Health Laboratory Service Board, London, England

Filed Mar. 8, 1988, Ser. No. 165,300

Claims priority, application United Kingdom, Mar. 17, 1987, 8706313

Int. Cl.[5] A61K *31/56*

U.S. Cl. 514—182 14 Claims

1. A method for the treatment of patients infected with human immuno-deficiency virus (HIV) comprising administering an effective amount of a bile acid or derivative thereof.

4,957,911

BENZAZECINE DERIVATIVES FOR COGNITIVE AND MEMORY FUNCTIONS

Werner Aschwanden, Ettingen; René Imhof, Gipf-Oberfrick, both of Switzerland; Roland Jakob, Inzlingen, Fed. Rep. of Germany, and Emilio Kyburz, Reinach, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

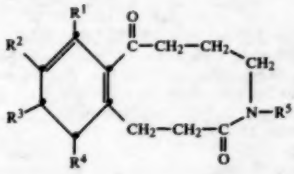
Division of Ser. No. 154,760, Feb. 11, 1988, Pat. No. 4,876,340, which is a division of Ser. No. 121,987, Nov. 18, 1987, Pat. No. 4,749,791, which is a division of Ser. No. 5,712, Jan. 21, 1987, Pat. No. 4,732,979. This application Aug. 17, 1989, Ser. No. 395,380

Claims priority, application Switzerland, Jan. 23, 1986, *266/86*

Int. Cl.[5] A61K *31/395*; C07P *227/08*

U.S. Cl. 514—183 4 Claims

1. A pharmaceutical composition which comprises a compound of the formula



I

wherein R^1 and R^2 are independently hydrogen or chlorine, R^3 is hydrogen, fluorine, chlorine, bromine or methoxy, R^4 is hydrogen, chlorine or methoxy, and R^5 is hydrogen, acetyl, propionyl, benzoyl, chlorobenzoyl, methoxybenzoyl or phenylacetyl, with the proviso that 2 or 3 of the groups R^1 to R^4 are hydrogen, and a therapeutically inert excipient.

4. A method of controlling cerebral insufficiency, comprising administering to a mammal an effective amount of a compound selected from the group consisting of

4-acetyl-8-chloro-1,2,3,4,5,6-hexahydrobenzo[*f*]-quinoline;

4-acetyl-10-chloro-1,2,3,4,5,6-hexahydrobenzo[f]-quinoline and

8-chloro-4-(p-chlorobenzoyl)-1,2,3,4,5,6-hexahydrobenzo[f-]quinoline.

4,957,912

7 ACYLAMIDOCARBACEPHEM ANTIBACTERIAL AGENTS

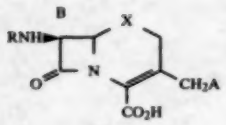
Burton G. Christensen, Scotch Plains, Ronald W. Ratcliffe, Matawan, both or N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 644,075, Aug. 24, 1984, abandoned, which is a continuation of Ser. No. 320,791, Nov. 12, 1981, abandoned, which is a continuation of Ser. No. 137,678, Apr. 7, 1980, abandoned, which is a division of Ser. No. 47,593, Jun. 8, 1979, Pat. No. 4,226,866, which is a continuation of Ser. No. 869,199, Jan. 13, 1978, abandoned, which is a continuation of Ser. No. 587,526, Jun. 16, 1975, abandoned, which is a continuation-in-part of Ser. No. 395,662, Sep. 18, 1973, abandoned, which is a continuation-in-part of Ser. No. 303,905, Nov. 6, 1972, abandoned. This application Dec. 23, 1985, Ser. No. 812,497

Int. Cl.[5] C07D *471/04, 498/053, 487/04*; A61K *31/545*

U.S. Cl. 514—210 18 Claims

1. A compound of the formula:



and its isomers wherein R is a carboxylic acyl radical, B is H, OCH_3, CH_3 or SR'' wherein R'' is lower alkyl of 1–6 carbons and phenyl; A is hydrogen, azido, halo, cyano, quaternary ammonium, hydroxy, carbamoyloxy, N-lower alkyl carbamoyloxy, N,N-di-lower alkyl carbamoyloxy, amino, mercapto, lower alkylthio, lower alkanoyloxy, aroyloxy or a 5-membered heterocyclic thio radical selected from the group consisting of 1-methyltetrazolylthio and 2-methyl-1,3,4-thiadiazolylthio, and X is the divalent radical $—CH_2—$, and non-toxic pharmacologically acceptable salts, esters and amides thereof.

18. A method of treating bacterial infections in animals or humans comprising administering an antibacterially effective amount of a compound according to claim **1** together with a pharmaceutically acceptable carrier therefor.

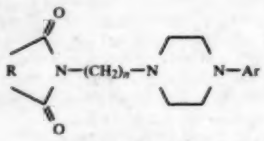
4,957,913

ANTIHYPERTENSIVE POLYCYCLIC IMIDES

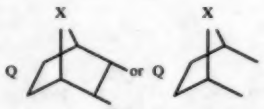
Magid A. Abou-Gharbia, Glen Mills; Gary P. Stack, Merion, and Rodney W. Lappe, Phoenixville, all of Pa., assignors to American Home Products Corp., New York, N.Y.

Filed Nov. 22, 1989, Ser. No. 440,573
Int. Cl.[5] **A61K** *31/50, 31/55*
U.S. Cl. 514—216 **10 Claims**

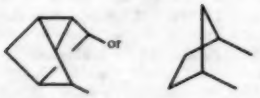
1. A method for lowering blood pressure which comprises administering to a hypertensive mammal, an antihypertensive amount of a compound of the formula:



wherein
R is



in which
X is methylene, ethylene or ethylidene and Q is alkylene of 1 to 4 carbon atoms, alkylidene of 2 to 4 carbon atoms, or Q is



in which the dotted line represents optional unsaturation;
n is one of the integers 2, 3 or 4;
Ar is phenyl or phenyl substituted with halo, trifluoromethyl or alkoxy of 1 to 3 carbon atoms, or Ar is 2-pyrimidinyl or halopyrimidin-2-yl, 2-pyrazinyl, or halo-pyrazin-2-yl, 2-pyridinyl, cyanopyridin-2-yl or halopyridin-2-yl;
or a pharmaceutically acceptable salt thereof.

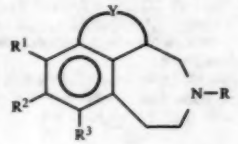
4,957,914

1,9-ALKANO-BRIDGED-2,3,4,5-TETRAHYDRO-1H-3-BENZAZEPINES

Robin D. Clark, Palo Alto; Jacob Berger, Los Altos Hills, and Klaus K. Weinhardt, San Francisco, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

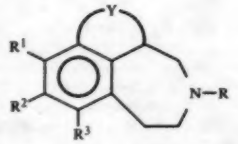
Division of Ser. No. 50,977, May 15, 1987, abandoned. This application Aug. 12, 1988, Ser. No. 231,818
Int. Cl.[5] **C07D** *223/16, 223/32, 223/18;* **A61K** *31/55*
U.S. Cl. 514—217 **29 Claims**

1. A compound represented by the formula:



wherein:
R is selected from the group consisting of hydrogen, cyano, lower alkyl, lower alkenyl, and aralkyl;
each of R^1, R^2 and R^3 is independently selected from the group consisting of: hydrogen, hydroxy, halo, trifluoromethyl, nitro, lower alkoxy, lower alkyl, and lower alkylthio; and
Y is lower alkylene having from two to four carbon atoms;
or a pharmaceutically acceptable salt thereof.

26. A method of treating depression, anxiety or hypertension in mammals, which comprises administering to a mammal suffering therewith a therapeutically effective amount of a compound represented by the formula:



wherein:
R is selected from the group consisting of hydrogen, cyano, lower alkyl, lower alkenyl, and aralkyl;
each of R^1, R^2 and R^3 is independently selected from the group consisting of: hydrogen, hydroxy, halo, trifluoromethyl, nitro, lower alkoxy, lower alkyl, and lower alkylthio; and
Y is lower alkylene having from two to four carbon atoms; or a pharmaceutically acceptable salt thereof.

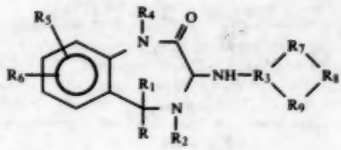
4,957,915

BENZODIAZEPINE ANALOGS

Sun H. Kim, Chestnut Hill, and John E. Taylor, Upton, both of Mass., assignors to Biomeasure, Inc., Hopkinton, Mass.

Filed Feb. 27, 1989, Ser. No. 316,463
Int. Cl.[5] **C07D** *243/14;* **A61K** *31/55*
U.S. Cl. 514—221 **13 Claims**

1. A benzodiazepine of the formula:



(I)

where:

R represents H, alkyl, alkenyl, cycloalkyl or cycloalkenyl, each with up to 8 carbon atoms; phenylalkyl with an alkylene chain of 1 to 3 carbon atoms and optionally substituted on the phenyl radical with one or two substituents each selected from the group consisting of Cl, Br, F, CN, CF_3, NO_2, lower alkyl, and OCH_3; or represents a phenyl radical which is optionally substituted with one or two substituents selected from the group consisting of Cl, F, Br, CN, I, CF_3 NO_2, lower alkyl, and OCH_3, or represents a 5-membered or 6-membered heterocyclic radical with 1 or 2 heteroatoms from the group consisting of O, N and S;

R_1 represents H or, together with R_2, forms a bond;

R_2 and R_4 independently of one another represent H or an alkyl radical with 1 to 6 carbon atoms, or represent a phenylalkyl radical with an alkyl chain of 1 to 3 carbon atoms and optionally substituted on the phenyl radical with one or two substituents each selected from the group consisting of Cl, Br, F, CN, CF_3, NO_2, lower alkyl, and OCH_3;

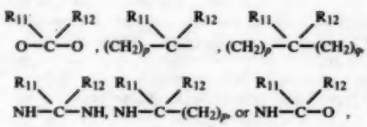
R_2 together with R_1, forms a bond;

R_5 and R_6 independently of one another represent H, Cl, Br, F, CN, CF_3, NO_2, lower alkyl, or OCH_3;

R_3 is $(CH_2)_nCH$ where n is between 0 and 5 inclusive; or $(CH_2)_nCR_{14}{=}CR_{14}$; wherein R_{14}=*H or about*

R_7 and R_9 are independently CH_2 or C=O;

R_8 is



p and q are independently between 0 and 4 and the sum of p and q is 4 or less;

m is between 2 and 4 inclusive; and

R_{11} and R_{12} are independently 4 or a lower alkyl of between 1 and 5 carbon atoms.

10. A method for treating a disorder in learning or memory which comprises administering to a patient in need thereof an amount effective therefore of the compound of claim **1**.

4,957,916

ANTIPSYCHOTIC 3-PIPERAZINYLBENZAZOLE DERIVATIVES

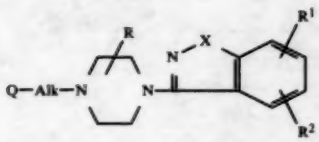
Ludo E. J. Kennis, Turnhout; Jan Vandenberk, Beerse, and Josephus C. Mertens, Turnhout, all of Belgium, assignors to Janssen Pharmaceutica N.V., Beerse, Belgium

Continuation-in-part of Ser. No. 228,417, Aug. 5, 1988, abandoned. This application Jun. 14, 1989, Ser. No. 366,103

Int. Cl.[5] **A61K** *31/495*; **C07D** *403/14, 413/14, 417/14*

U.S. Cl. 514—254 **15 Claims**

1. A chemical compound having the formula



(I)

A pharmaceutically acceptable acid addition salt form thereof or a stereochemical isomeric form thereof, wherein

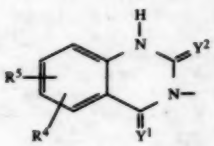
R is hydrogen or C_{1-4}alkyl;

R^1 and R^2 each independently are hydrogen, halo, hydroxy, C_{1-6}alkyloxy or C_{1-6}alkyl;

X is O, S or NR^3; said R^3 being hydrogen, C_{1-6}alkyl, aryl or arylC_{1-6}alkyl;

Alk is C_{1-4}alkanediyl; and

Q is a radical of formula



(a)

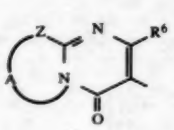
wherein

Y^1 and Y^2 each independently are O or S;

R^4 is hydrogen, halo, C_{1-6}alkyl, C_{1-6}alkyloxy, trifluoromethyl, nitro, cyano, hydroxy, (C_{1-10}alkylcarbonyl)oxy, amino, mono- and di(C_{1-6}alkyl)amino, (C_{1-10}alkylcarbonyl)amino, phenylmethoxy or azido;

R^5 is hydrogen or halo; or

Q is a radical of formula



(b)

wherein

R^6 is hydrogen or C_{1-6}alkyl;

Z is —S— or —CR^7=CR^8—; said R7 and R^8 each independently being hydrogen or C_{1-6}alkyl; or Z is —CH_2— wherein one hydrogen atom may be replaced by hydroxy or C_{1-6}alkyl;

A is a bivalent radical —CH_2—CH_2— or —CH_2—CH_2—CH_2—wherein in the latter two radicals one or two hydrogen atoms may be replaced by C_{1-6}alkyl; or A is a bivalent radical —CR^9=CR^{10}, wherein R^9 and R^{10} each independently are hydrogen, halo, amino or C_{1-6}alkyl; or when Z is —S— then A may also be —CR^{11}=N—, R^{11} being hydrogen or C_{1-6}alkyl; or when Z is —CR^7=CR^8—, then A also may be —O—; and

each aryl is phenyl optionally substituted with up to three substituents independently selected from C_{1-6}alkyl, C_{1-6}alkyloxy, hydroxy, halo, amino, nitro and trifluoromethyl.

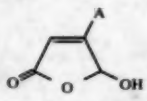
11. A method of treating warm-blooded animals suffering from psychotic diseases comprising the administration to said warm-blooded animals of an antipsycothically effective amount of a chemical compound as claimed in claim **1**.

4,957,917
ANTI-INFLAMMATORY FURANONES

Gary C. M. Lee, Laguna Hills, Calif., assignor to Allergan, Inc., Irvine, Calif.

Filed Oct. 25, 1989, Ser. No. 427,201
Int. Cl.[5] A61K 31/34; C07D 307/28
U.S. Cl. 514—231.5 9 Claims

1. A compound of the formula:



in which:

A is —CH(OCOR$_1$)CH$_2$CO—Y, —CH=C(R$_2$)—R, —CH=CHCO—Z, —CH=C(R$_3$)—CO$_2$R; —C=CR$_4$, —CH=CH(CH$_2$)$_n$OX or —CH(OH)CH$_2$CO—Y; R is C$_7$–C$_{14}$ alkyl; R$_1$ is C$_1$–C$_4$ alkyl or NHR$_7$; R$_7$ is H, phenyl or C$_1$–C$_4$ alkyl; R$_2$ is halogen or CO$_2$R$_5$; R$_3$ is hydrogen or CO$_2$H ; R$_4$ is C$_7$–C$_{14}$ alkyl, phenyl(CH$_2$)$_m$, (CH$_2$)$_n$OX or (CH$_2$)$_n$CO$_2$R$_5$; R$_5$ is C$_1$–C$_4$ alkyl; m is 4–8; n is 7–14; and X is hydrogen, acetyl, PO(OH)$_2$, CO(CH$_2$)$_3$N(R$_1$)$_2$ or CO(CH$_2$)$_3$N(R$_1$)$_2$.HCl or another pharmaceutically acceptable salt; Y is O—C$_7$–C$_{14}$ alkyl or NHR$_6$; Z is C$_7$–C$_{14}$ alkyl, morpholine, N-methylpiperazine or NHR$_6$; and R$_6$ is C$_7$–C$_{14}$ alkyl, phenylethyl, NR$_8$(CH$_2$)$_n$N(R$_9$)$_3$, NR$_8$(CH$_2$)$_n$N(R$_9$)$_3$.HCl or NR$_8$(CH$_2$)$_n$CO$_2$H; R$_8$ is H, C$_1$–C$_3$ alkyl; n is 1–8; and R$_9$ is H or C$_1$–C$_3$ alkyl.

4,957,918
TOPICAL TREATMENT OF BLEPHARITIS

Neil F. Martin, Silver Spring, and Howard N. Robinson, Lutherville, both of Md., assignors to Leonard Bloom and Marvin S. Towsend, both of Towson, Md., a part interest

Filed Jun. 9, 1988, Ser. No. 204,547
Int. Cl.[5] A61K 31/415, 31/535
U.S. Cl. 514—235.8 13 Claims

1. A pharmaceutical composition, comprising:

an amount of metronidazole effective to treat blepharitis and blepharoconjunctivitis in an animal or human patient; and

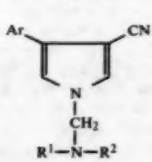
a carrier for said metronidazole compound, said carrier suitable for topical application to ocular tissues, wherein said carrier includes an artificial tear composition.

4,957,919
1-AMINOMETHYL-3-ARYL-4-CYANO-PYRROLES AND USE AS FUNGICIDES

Detlef Wollweber, Wuppertal; Wolfgang Krämer, Burscheid; Wilhelm Brandes, Leichlingen; Stefan Dutzmann, Duesseldorf, and Gerd Hänssler, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Division of Ser. No. 363,015, Jun. 8, 1989, Pat. No. 4,923,883, which is a division of Ser. No. 147,466, Jan. 25, 1988, Pat. No. 4,914,122. This application Jan. 12, 1990, Ser. No. 464,463
Claims priority, application Fed. Rep. of Germany, Jan. 31, 1987, 3702852
Int. Cl.[5] A61K 31/38, 31/40; C07D 417/12, 413/12
U.S. Cl. 514—237.2 11 Claims

1. A 1-aminomethyl-3-aryl-4-cyanopyrrole of the formula



in which

Ar represents optionally substituted phenyl,

R^1 represents optionally substituted alkyl, represents alkenyl, alkynyl or cycloalkyl, or represents in each case optionally substituted aralkyl or aryl, and

R^2 represents in each case optionally substituted heterocyclylalkyl, heterocyclylalkenyl, heterocyclylalkynyl or heterocyclyl, where heterocyclyl in each case represents a morpholine or thiomorpholine radical.

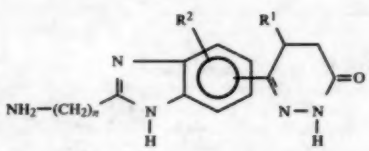
10. A fungicidal composition comprising a fungicidally effective amount of a 1-aminomethyl-3-aryl-4-cyano-pyrrole according to claim 1 and a diluent.

4,957,920
BENZIMIDAZOLES, AND PHARMACEUTICAL PREPARATIONS CONTAINING THESE COMPOUNDS

Peter Mörsdorf, Langenzenn; Helmut Schickaneder, Eckental; Rolf Herter, Schwabach; Volker Pfahlert, Nuremberg; Heidrun Engler, Cadolzburg, and Kurt H. Ahrens, Nuremberg, all of Fed. Rep. of Germany, assignors to Heumann Pharma GmbH & Co., Nuremberg, Fed. Rep. of Germany

Filed Mar. 15, 1988, Ser. No. 168,273
Claims priority, application Fed. Rep. of Germany, Oct. 8, 1987, 3734083
Int. Cl.[5] C07D 401/14; A61K 31/50
U.S. Cl. 514—252 8 Claims

1. Benzimidazoles corresponding to the formula I



(I)

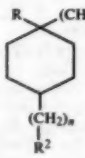
wherein the pyridazinone ring is attached in the 5- or 6-position of the benzimidazole ring and R^1 stands for a hydrogen atom or a straight chained or branched C$_1$ to C$_4$ alkyl group, R^2 stands for a hydrogen atom, a straight chained or branched C$_1$ to C$_4$ alkyl group, a C$_1$ to C$_4$ alkoxy group, a hydroxy group, a halogen atom, an amino group or a nitro group, and wherein n stands for an integer with a value from 1 to 6, and the pharmaceutically acceptable salts thereof.

4,957,921
SUBSTITUTED CYCLOHEXANOLS AS CENTRAL NERVOUS SYSTEM AGENTS

Bradley W. Caprathe, Redford; Juan C. Jaen, Plymouth; Sarah J. Smith, and Lawrence D. Wise, both of Ann Arbor, all of Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Dec. 6, 1989, Ser. No. 446,901
Int. Cl.[5] A61K 31/495, 31/44, 31/445, 31/505; C07D 401/14, 409/14
U.S. Cl. 514—252 6 Claims

1. A compound of Formula I



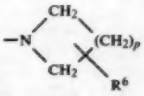
I

wherein

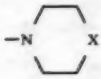
R is —OR^3, wherein R^3 is hydrogen, lower alkyl, phenyl lower alkyl, phenyl lower alkyl substituted by one to four

substituents selected from the group consisting of lower alkyl, lower alkoxy, lower thioalkoxy, halogen and trifluoromethyl, lower alkanoyl, phenylcarbonyl, phenylcarbonyl substituted by one to four substituents selected from the group consisting of lower alkyl, lower alkoxy, lower thioalkoxy, halogen and trifluoromethyl, or phenyl lower alkanoyl, phenyl lower alkanoyl substituted by one to four substituents selected from the group consisting of lower alkyl, lower alkoxy, lower thioalkoxy, halogen and trifluoromethyl,

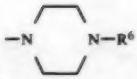
wherein R^4 and R^5 are each independently hydrogen, lower alkyl, phenyl, phenyl substituted by one to four substituents selected from the group consisting of lower alkyl, lower alkoxy, lower thioalkoxy, halogen and trifluoromethyl, phenyl lower alkyl, phenyl lower alkyl substituted by one to four substituents selected from the group consisting of lower alkyl, lower alkoxy, lower thioalkoxy, halogen and trifluoromethyl, lower alkanoyl, phenyl lower alkanoyl, phenyl lower alkanoyl substituted by one to four substituents selected from the group consisting of lower alkyl, lower alkoxy, lower thioalkoxy, halogen and trifluoromethyl, phenylcarbonyl, phenylcarbonyl substituted by one to four substituents selected from the group consisting of lower alkyl, lower alkoxy, lower thioalkoxy, halogen and trifluoromethyl, or R^4 and R^5 are taken together with the nitrogen atom to which they are attached to form a ring denoted by



wherein p is zero or an integer from 1 to 4 and R^6 is hydrogen or lower alkyl,

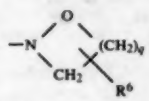


wherein X is oxygen or sulfur or



wherein R^6 is as defined above, or

wherein R^4 and R^5 are each independently hydrogen, lower alkyl, phenyl, phenyl substituted by one to four substituents selected from the group consisting of lower alkyl, lower alkoxy, lower thioalkoxy, halogen and trifluoromethyl, phenyl lower alkyl, phenyl lower alkyl substituted by one to four substituents selected from the group consisting of lower alkyl, lower alkoxy, lower thioalkoxy, halogen and trifluoromethyl, lower alkanoyl, phenyl lower alkanoyl, phenyl lower alkanoyl substituted by one to four substituents selected from the group consisting of lower alkyl, lower alkoxy, lower thioalkoxy, halogen and trifluoromethyl, phenylcarbonyl, phenylcarbonyl substituted by one to four substituents selected from the group consisting of lower alkyl, lower alkoxy, lower thioalkoxy, halogen and trifluoromethyl, or R^4 and R^5 are taken together with the oxygen and nitrogen atoms to which they are attached to form a ring denoted by



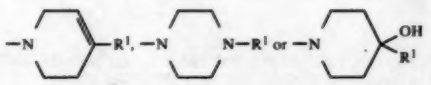
wherein q is an integer from 2 to 3 and R^6 is as defined above;

m is zero or an integer from 1 to 2;

R^1 is phenyl, phenyl substituted by one to four substituents selected from the group consisting of lower alkyl, lower alkoxy, lower thioalkoxy, halogen and trifluoromethyl, 2-, 3-, or 4-pyridinyl or 2-, 3-, or 4-pyridinyl substituted by lower alkyl, lower alkoxy, or halogen, 2-, 4-, or 5-pyrimidinyl or 2-, 4-, or 5-pyrimidinyl substituted by lower alkyl, lower alkoxy, or halogen, 2-pyrazinyl or 2-pyrazinyl substituted by lower alkyl, lower alkoxy, or halogen, 2- or 3-thienyl or 2- or 3-thienyl substituted by lower alkyl or halogen, 2- or 3-furanyl or 2- or 3-furanyl substituted by lower alkyl or substituted by lower alkyl or halogen;

n is zero or an integer from 1 to 4;

R^2 is



wherein R^1 is as defined above; and the corresponding cis and trans isomers thereof; or a pharmaceutically acceptable acid addition salt thereof.

5. A method of treating schizophrenia comprising administering to a host suffering therefrom a therapeutic effective amount of a compound according to claim 1 in unit dosage form.

4,957,922

INFUSION SOLUTIONS OF 1-CYCLOPROPYL-6-FLUORO-1,4-DI-HYDRO-4-OXO-7-(1-PIPERAZINYL)-QUINOLINE-3-CARBOXYLIC ACID

Robert F. Lammens, Leverkusen; Hans F. Mahler, Colonge, and Peter Serno, Colonge, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 917,467, Oct. 10, 1986, abandoned. This application Mar. 29, 1989, Ser. No. 329,922

Claims priority, application Fed. Rep. of Germany, Oct. 24, 1985, 3537761

Int. Cl.[5] **A61K** *31/495*

U.S. Cl. 514—255 **13 Claims**

1. An aqueous infusion solution comprising 0.015 to 0.5 g of an active compound, said active compound being 1-cyclopropyl-6-fluoro-1,4-dihydro-4-oxo-7-(1-piperazinyl)-quinoline-3-carboxylic acid, per 100 ml of aqueous solution and an amount of at least one physiologically tolerated acid which suffices to dissolve the active compound, wherein there are 1.33 to 2.2 moles per mole of active compound, of the physiologically tolerated acid, the physiologically tolerated acid being selected from the group consisting of hydrochloric acid, methanesulphinc acid, propionic acid, succinic acid, glutaric acid, citric acid, fumaric acid, maleic acid, tartaric acid, glutamic acid, gluconic acid, glucuronic acid, galacturonic acid, ascorbic

acid, phosphoric acid, nitric acid, acetic acid, malic acid, L-aspartic acid and lactic acid.

4,957,923

DIURETIC OR ANTIHYPERTENSIVE COMPOSITION

Mitsuyoshi Nakashima, Hamamatsu; Mitsutaka Kanamaru, Nagoya; Akira Sugiyama, Ikoma; Masato Terakawa, Nara; Takaharu Ono, Osaka, and Haruo Horiai, Amagasaki, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

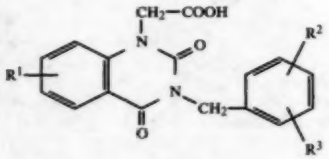
Filed Feb. 24, 1989, Ser. No. 314,886

Claims priority, application Japan, Feb. 29, 1988, 63-48005; Feb. 29, 1988, 63-48006

Int. Cl.[5] A61K *31/505*

U.S. Cl. 514—259 **1 Claim**

1. A method for treating edema or hypertension which comprises administering an effective amount of a quinazoline derivative of the formula:



wherein R^1, R^2 and R^3 each is a hydrogen atom or a halogen atom or a pharmaceutically acceptable salt thereof to a human being in need of said treatment.

4,957,924

THERAPEUTIC VALINE ESTERS OF ACYCLOVIR AND PHARMACEUTICALLY ACCEPTABLE SALTS THEREOF

Lilia M. Beauchamp, Raleigh, N.C., assignor to Burroughs Wellcome Co., Research Traingle Park, N.C.

Filed Aug. 4, 1988, Ser. No. 228,377

Claims priority, application United Kingdom, Aug. 15, 1987, 8719367

Int. Cl.[5] A61K *31/52;* **C07D** *473/16*

U.S. Cl. 514—262 **24 Claims**

1. A pharmaceutically acceptable salt of 2-[(2-amino-1,6-dihydro-6-oxo-9H-purin-9-yl)methoxy]ethyl L-valinate.

17. 2-[(2-amino-1,6-dihydro-6-oxo-9H-purin-9-yl)methoxy]ethyl L-valinate hydrochloride.

18. 2-[(2-amino-1,6-dihydro-6-oxo-9H-purin-9-yl)methoxy]ethyl L-valinate.

19. A method of generating acyclovir in the plasma of a mammal, which comprises orally administering the compound 2-[(2-amino-1,6-dihydro-6-oxo-9H-purin-9-yl)methoxy]ethyl L-valinate or a pharmaceutically acceptable salt thereof to said mammal.

4,957,925

AMINOALKOXYPHENYL DERIVATIVES, PROCESS OF PREPARATION AND COMPOSITIONS CONTAINING THE SAME

Jean Gubin; Pierre Chatelain, both of Brussels; Marcel Descamps, Wavre, all of Belgium; Dino Nisato, Saint Georges D'Orques, France; Henri Inion, Wemmel, Belgium; Jean Lacchetti, Chastre, Belgium; Jean-Marie Mahaux, Brussels, Belgium, and Jean-Noël Vallat, Toulouse, France, assignors to Sanofi, Paris, France

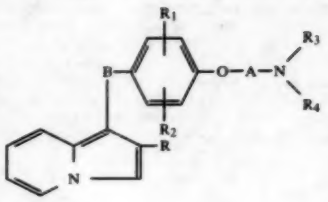
Continuation-in-part of Ser. No. 6,233, Jan. 23, 1987, abandoned. This application Aug. 7, 1987, Ser. No. 82,554

Claims priority, application France, Feb. 14, 1986, 86 02045

Int. Cl.[5] C07D *487/04, 237/28;* **A61K** *31/435, 31/50*

U.S. Cl. 514—299 **28 Claims**

1. An aminoalkoxyphenyl compound of formula:



in which:

B represents —S—, —SO— or —SO_2— group,

R denotes hydrogen, a linear- or branched-alkyl radical, a cycloalkyl radical containing at most 6 carbon atoms or a phenyl group which is unsubstituted or substituted with one or more substituents, which may be identical or different, selected from halogen atoms and from lower alkyl, lower alkoxy or nitro groups,

R_1 and R_2, which are identical or different, each denote hydrogen, a methyl or ethyl radical or a halogen,

A denotes a linear- or branched-alkylene radical having from 2 to 5 carbon atoms or a 2-hydroxypropylene radical in which the hydroxy is optionally substituted by a lower alkyl radical,

R_3 denotes a linear- or branched-alkyl radical or a radical of formula:

in which Alk denotes a single bond or a linear- or branched-alkylene radical having from 1 to 5 carbon atoms and R_5 denotes a pyridyl, phenyl, 2,3- methylenedioxyphenyl or 3,4-methylenedioxyphenyl radical or a phenyl group substituted with one or more substituents, which may be identical or different, selected from halogen atoms, lower alkyl groups or lower alkoxy groups,

R_4 denotes hydrogen or an alkyl radical,

or R_3 and R_4, when taken together, denote a 1,4-tetramethylene, 1,5-pentamethylene, 3-oxa-1,5-pentamethylene, 3-aza-1,5-pentamethylene, 3-methylaza-1,5-pentamethylene, 4-phenylaza-1,5-pentamethylene or —CH=CH—N=CH— radical,

as well as a pharmaceutically acceptable salt of this compound.

15. A method of treating angina pectoris, hypertension, arrhythmia and cerebral vascular insufficiency in a host in need of such treatment comprising the administration to this host of an effective dose of an aminoalkoxyphenyl derivative according to claim 1.

4,957,926

METHOD OF TREATING HERPESVIRUSES

Gary S. Jacob, Oxford; A. Stanley Tyms, London; Thomas W. Rademacher, and Raymond A. Dwek, both of Oxford, all of United Kingdom, assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 22, 1988, Ser. No. 288,528

Int. Cl.[5] A61K *31/445*

U.S. Cl. 514—315 **9 Claims**

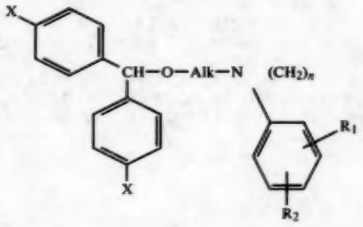
1. A method for the treatment of herpesvirus infections in an infected human host comprising administering to said host an effective amount to inhibit herpesvirus of 1,5-(alkylimino)-1,5-dideoxy-D-glucitol in which the alkyl group contains from one to about six carbon atoms.

4,957,927
(DIARYLMETHOXY ALKYL)-1-PYRROLIDINES AND-PIPERIDINES HAVING CARDIOVASCULAR ACTIVITY

Gerard Ferrand, Lyons; Jacques Barbanton, Brignais; Jean-Claude Depin, Lyons, and Gilles Chavernac, La Mulatiere, all of France, assignors to Lipha, Lyonnaise Industrielle Pharmaceutique, Lyons, France

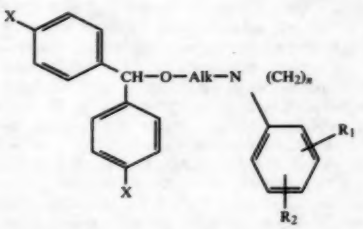
Filed Sep. 22, 1989, Ser. No. 410,705
Claims priority, application France, Sep. 23, 1988, 88 12430
Int. Cl.[5] C07D *207/04, 211/04;* A61K *31/445, 31/40*
U.S. Cl. 514—428 7 Claims

1. 1-[(diarylmethoxy)alkyl]pyrrolidines and piperidines having the following formula:



wherein X is selected from the group consisting of hydrogen and fluorine; Alk is selected from the group consisting of linear-chain and branched alkyl groups containing two or three carbon atoms; R_1 and R_2 are selected from the group consisting of hydrogen and linear-chain or branched alkoxy radicals having from 1 to 4 carbon atoms; n is 4 or 5; and their pharmaceutically-acceptable mineral and organic acid salts.

7. A pharmaceutical composition comprising an effective amount of a 1-[(diarylmethoxy)alkyl]pyrrolidine or piperidine having the following formula as a main active ingredient:



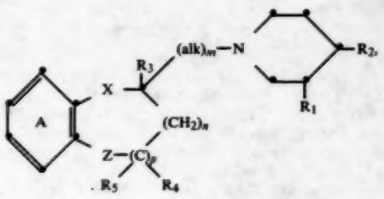
wherein X is selected from the group consisting of hydrogen and fluorine atom; Alk is selected from the group consisting of linear-chain and branched alkyl groups containing two or three carbon atoms; R_1 and R_2 are selected from the group consisting of hydrogen and linear-chain and branched alkoxy radicals having from 1 to 4 carbon atoms; n is 4 or 5; and their pharmaceutically-acceptable mineral acid or organic salts.

4,957,928
HYDROGENATED 1-BENZOOXACYCLOALKYLPYRIDINECARBOXYLIC ACID COMPOUNDS

Wolfgang Fröstl, and Armin Züst, both of Basle, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 63,188, Jun. 16, 1987, abandoned. This application Dec. 21, 1988, Ser. No. 288,332
Claims priority, application Switzerland, Jun. 26, 1986, 2588/86; Dec. 23, 1987, 5008/87
Int. Cl.[5] C07D *405/06;* A61K *31/445*
U.S. Cl. 514—318 18 Claims

1. A compound of the formula



in which alk is lower alkylene or lower alkylidene, the dotted line is intended to indicate the presence of a single or a double bond between the carbon atoms carrying the substituents R_1 and R_2, R_3 is hydrogen or lower alkyl, R_4 is lower alkyl, R_5 is lower alkyl, and in which (A) either R_1 represents carboxy, lower alkoxycarbonyl, carbamoyl, N-lower alkylcarbamoyl, N,N-di-lower alkylcarbamoyl, hydroxymethyl, lower alkanoyloxymethyl, lower alkanesulphonyloxymethyl, benzoyloxymethyl or pyridoyloxymethyl and R_2 represents hydrogen, hydroxy, lower alkoxy, benzyloxy, lower alkanoyloxy, lower alkanesulphonyloxy, benzoyloxy, pyridoyloxy, amino, lower alkanoylamino, lower alkanesulphonylamino, benzoylamino or pyridoylamino, or R_1 represents hydrogen and R_2 represents carboxy, lower alkoxycarbonyl, carbamoyl, N-lower alkylcarbamoyl, N,N-di-lower alkylcarbamoyl, hydroxymethyl, lower alkanoyloxymethyl, lower alkanesulphonyloxymethyl, benzoyloxymethyl or pyridoyloxymethyl and in which the ring A is unsubstituted or is mono- or poly-substituted by hydroxy, lower alkoxy, lower alkanoyloxy, halogen, lower alkyl or trifluoromethyl, p is 0, m is 1, and in which either each of X and Z is an oxygen atom and n is 1, or X is a methylene groups, Z is an oxygen atom and n is 1, or X is an oxygen atom, Z is a methylene group and n is 1, or X is a direct bond, Z is an oxygen atom and n is 2, with the proviso, that R_2 is different from carbamoyl, if R_1 is hydrogen, R_3 is hydrogen, alk is methylene, ethylene or 1,3-propylene, the ring A is unsubstituted or is monosubstituted in the 6- or 7-position or is disubstituted in the 6- and 7-position, substituents being selected from the group consisting of lower alkoxy, halogen, lower alkyl and trifluoromethyl, the dotted line is intended to indicate the presence of a single bond, each of X and Z is an oxygen atom, and n is 1, or if R_1 represents hydrogen, R_3 is hydrogen, alk represents ethylidene, the ring A is unsubstituted, the dotted line is intended to indicate the presence of a single bond, each of X and Z is an oxygen atom, and n is 1, or in which (B) either R_1 is carboxy, lower alkoxycarbonyl, carbamoyl, N-lower alkylcarbamoyl, N,N-di-lower alkylcarbamoyl, N,N-lower alkylenecarbamoyl, N,N-(aza)-, N,N-(oxa)- or N,N-(thia)-lower alkylenecarbamoyl, hydroxymethyl, lower alkanoyloxymethyl, lower alkanesulfonyloxymethyl, benzoyloxymethyl or pyridoyloxymethyl and R_2 is hydrogen, hydroxy, lower alkoxy, benzyloxy, lower alkanoyloxy, lower alkanesulfonyloxy, benzoyloxy, pyridoyloxy, amino, lower alkanoylamino, lower alkanesulfonylamino, benzoylamino or pyridoylamino, or R_1 is hydrogen and R_2 is carboxy, lower alkoxycarbonyl, carbamoyl, N-lower alkylcarbamoyl, N,N-di-lower alkylcarbamoyl, N,N-lower alkylenecarbamoyl, N,N-(aza)-, N,N-(oxa)- or N,N-(thia)-lower

alkylenecarbamoyl, hydroxymethyl, lower alkanoyloxymethyl, lower alkanesulfonyloxymethyl, benzoyloxymethyl or pyridoyloxymethyl, and in which the ring A is unsubstituted or is mono- or poly-substituted by hydroxy, lower alkoxy, lower alkanoyloxy, cyano, halogen, lower alkyl or by trifluoromethyl, p is 1, m is 0 or 1, Z is an oxygen atom, and in which either x is an oxygen atom or a methylene group and n is 0, or X is a direct bond and n is 1, or a tautomer thereof, in each case in free form or in form of a pharmaceutically acceptable salt.

18. A method of treating the symptoms of cerebral insufficiency in a subject in need of such treatment comprising administering to such subject a nootropically effective amount of a compound according to claim 1 or a tautomer thereof, in each case in free form or in the form of a pharmaceutically acceptable salt.

4,957,929

4-PHENYL-4-[N-(PHENYL)AMIDO]PIPERIDINE COMPOUNDS AND PHARMACEUTICAL COMPOSITIONS EMPLOYING SUCH COMPOUNDS

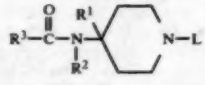
Linas V. Kudzma, North Bergen; H. Kenneth Spencer, Chatham, and Sherry A. Severnak, Plainfield, all of N.J., assignors to BOC, Inc., New Providence, N.J.

Division of Ser. No. 255,180, Oct. 7, 1988, Pat. No. 4,921,864, which is a division of Ser. No. 115,284, Nov. 2, 1987, Pat. No. 4,741,121. This application Nov. 22, 1988, Ser. No. 440,933

Int. Cl.[5] A61K *31/445;* **C07D** *401/06*

U.S. Cl. 514—326 **8 Claims**

5. A narcotic antagonistic or analgesic composition comprising a non-toxic pharmaceutically acceptable carrier and therapeutically effective amount of a compound of the formula



optically active isomeric forms thereof, or pharmaceutically acceptable acid addition salts thereof, in which formula: R^1 is phenyl; R^2 is phenyl unsubstituted or substituted by one or more halogens; R^3 is a lower alkyl, lower cycloalkyl or a lower alkoxy lower alkyl; and L is 1-H-pyrazolyl lower alkyl which can be substituted in the 4 position by a halogen.

4,957,930

DIHYDROPYRIDINE DERIVATIVES

David Alker, Birchington, and Peter E. Cross, Canterbury, both of England, assignors to Pfizer Inc., New York, N.Y.

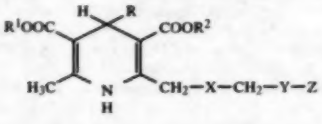
Filed Apr. 20, 1988, Ser. No. 183,817

Claims priority, application United Kingdom, Apr. 21, 1987, 8709447

Int. Cl.[5] C07D *211/86;* **A61K** *31/455*

U.S. Cl. 514—356 **7 Claims**

1. A compound of the formula



or a pharmaceutically acceptable acid addition salt thereof where

R is selected from the group consisting of phenyl, phenyl substituted by one or two substituents selected from the group consisting of halo and CF_3, and 2-chloro-3-pyridyl;

R^1 and R^2 are each independently methyl or ethyl;

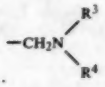
X is O or S;

Y is —CH=CH or —C≡C—;

and Z is

CHR^5OH wherein R^5 is H, n-butyl, or phenyl;

$—CO_2R^6$ where R^6 is H;



wherein R^3 and R^4 are each independently methyl; or when taken together with the N atom to which they are attached form a pyrrolidinyl, piperidino, morpholino, piperazinyl or N(C_1–C_4)alkyl piperazinyl group.

4,957,931

CERTAIN 1,2-BENZISOXAZOLE AND 1,2-BENZISOTHIAZOLE DERIVATIVES

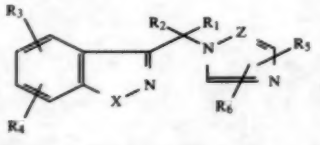
Robert M. Bowman, Summit, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 71,124, Jul. 8, 1987, Pat. No. 4,859,691. This application Jun. 9, 1989, Ser. No. 367,573

Int. Cl.[5] A61K *31/425;* **C07D** *117/06*

U.S. Cl. 514—373 **16 Claims**

1. A compound of the formula



(I)

where X represents sulfur, Z represents carbon (CH) so as to complete the imidazol-1yl ring radical or Z represents nitrogen (N) so as to complete the 1,2,4-triazol-1yl ring radical; R_1 represents hydrogen, lower alkenyl, lower alkynyl, carbocyclic aryl-lower alkyl or lower alkyl; R_2 represents hydrogen, lower alkenyl, lower alkynyl, carbocyclic aryl-lower alkyl or lower alkyl; or R_1 and R_2 combined represents C_1–C_6-alkylene; or R_1 combined with R_6 located on the Z-carbon atom of the imidazolyl radical represents C_2–C_4 alkylene; R_3 and R_4 independently represent hydrogen, lower alkyl, C_5–C_7-cycloalkyl, halogen, trifluoromethyl, cyano, nitro, amino, hydroxy, lower alkanoyloxy, carbocyclic aroyloxy, lower alkoxy or carbocyclic aryl; or R_3 and R_4, together when located on adjacent carbon atoms, represent lower alkylenedioxy; or R_3 and R_4, together when located on adjacent carbon atoms, represent 1,3-butadienylene or C_3–C_5-alkylene to form with the carbon atoms to which such is attached a benzo-fused or C_5–C_7-cycloalka-fused ring, respectively; R_5 located on carbon represents hydrogen, lower alkyl or hydroxy-lower alkyl; R_6 located on carbon represents hydrogen or lower alkyl; or when z represents carbon, R_5 located on the Z-carbon atom combined with R_6 located on the adjacent carbon atom represents C_3-C_5-alkylene; carbocyclic aryl within the above definitions represents phenyl or phenyl substituted by lower alkyl, lower alkoxy, trifluoromethyl or halogen; carbocyclic aroyloxy represents benzoyloxy, benzoyloxy substituted on the phenyl ring by trifluoromethyl, lower alkyl, halogen or lower alkoxy; or a pharmaceucally acceptable salt thereof.

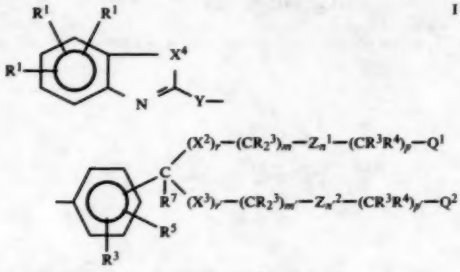
14. A pharmaceutical composition for the treatment of convulsions in mammals comprising an anticonvulsant effective amount of a compound of claim 1 in combination with one or more pharmaceutically acceptable carriers.

4,957,932
BENZOHETERAZOLES

Robert N. Young, Senneville, and Robert Zamboni, Longueuil, both of Canada, assignors to Merck Frosst Canada, Inc., Kirkland, Canada

Filed Nov. 25, 1987, Ser. No. 125,049
Int. Cl.[5] C07D 763/56; A61K 31/42
U.S. Cl. 514—375 **13 Claims**

1. A compound of the formula:



I

wherein:

R^1 is H, halogen, C_1–C_8 alkyl, C_2–C_8 alkenyl, C_{2-C8} alkynyl, $—CF_3$, $—SR^2$, $—S(O)R^2$, $—S(O)_2R^2$, $—NR^3R^3$, $—OR^3$, $—COOR^3$, $—(C═O)R^3$, $—C(OH)R^3R^3$, —CN, $—NO_2$, $—N_3$, substituted or unsubstituted phenyl, substituted or unsubstituted benzyl, substituted or unsubstituted 2-phenethyl, or substituted or unsubstituted pyridyl;

R^2 is C_1–C_8 alkyl, C_{2-C8} alkenyl, C_{2-C8} alkynyl, $—CF_3$, substituted or unsubstituted phenyl, substituted or unsubstituted benzyl, or substituted or unsubstituted 2-phenethyl;

R^3 is H or R^2;

R^4 is H, halogen, $—NO_2$, —CN, $—OR^3$, $—SR^3$, NR^3R^3, or C_1–C_8 alkyl;

R^5 is H, halogen, $—NO_2$, $—N_3$, —CN, $—SR^2$, $—NR^3R^3$, $—OR^3$, C_1–C_8 alkyl, or $—(C═O)R^3$;

R^6 is $—(CH_2)_s—C(R^7R^7)—(CH_2)_s—R^8$ or $—CH_2CONR^{12}R^{12}$;

R^7 is H or C_1–C_4 alkyl;

R^8 is

(A) a monocyclic or bicyclic heterocyclic radical containing from 3 to 12 nuclear carbon atoms and 1 or 2 nuclear heteroatoms selected from N, S or O and with each ring in the heterocyclic radical being formed of 5 or 6 atoms, or

(B) the radical W-R^9;

R^9 contains up to 21 carbon atoms and is (1) a hydrocarbon radical or (2) an acyl radical of an organic acyclic or monocyclic carboxylic acid containing not more than 1 heteroatom in the ring;

R^{10} is $—SR^{11}$, $—OR^{12}$, or $—NR^{12}R^{12}$;

R^{11} is C_1–C_6 alkyl, $—(C═O)R^{14}$, unsubstituted phenyl, or unsubstituted benzyl;

R^{12} is H, R^{11}, or two R^{12} groups joined to the same N may form a ring of 5 or 6 members containing up to two heteroatoms chosen from O, S or N;

R^{13} is C_1–C_8 alkyl, C_2–C_8 alkenyl, C_{2-C8} alkynyl, $—CF_3$, or unsubstituted phenyl, benzyl, or 2-phenethyl;

R^{14} is H or R^{13};

R^{15} is R^3 halogen;

R^{16} is H, C_1–C_4 alkyl, or OH;

m and m′ are independently 0–8;

n and n′ are independently 0 or 1;

p and p′ are independently 0–8;

m+n+p is 1–10 when X^2 is O, S, S(O), or $S(O)_2$;

m+n+p is 0–10 when X^2 is CR^3R^{16};

m′+n′+p′ is 1–10 when X^3 is O, S, S(O), or $S(O)_2$;

m′+n′+p′ is 0–10 when X^3 is CR^3R^{16};

r is 0 or 1 when Z^1 is HET (—R^3, —R^5);

r is 1 when Z^1 is $CONR^3$;

r′ is 0 or 1 when Z^2 is HET(—R^3—R^5);

r′ is 1 when Z^2 is $CONR^3$;

s is 0–3;

Q^1 and Q^2 are independently $—COOR^3$, tetrazole, $—COOR^6$, $—CONHS(O)_2R^{13}$, —CN, $—CONR^{12}R^{12}$, —CHO, $—CH_2OH$, $—COCH_2OH$, $—NHS(O)_2R^{13}$; or if Q^1 or Q^2 is COOH and R^4 is —OH, —SH, or $—NHR^3$ then Q^1 or Q^2 and R^4 and the carbons through which they are attached may form a heterocyclic ring by loss of water;

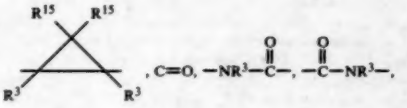
W is O, S, or $—NR^3$;

X^1 is O, S, —S(O)—, $—S(O)_2—$, $—NR^3$, or $—CR^3R^3—$;

X^2 and X^3 are independently O, S, S(O), $S(O)_2$, or CR^3R^{16};

X^4 is O;

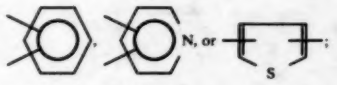
Y is $—CR^3═CR^3—$, —C≡C—, $—CR^3R^3—X^1—$, $—X^1—CR^3R^3—$, $—CR^3R^3—X^1—CR^3R^3—$,



O, S, or NR^3;

Z^1 and Z^2 are independently $—CONR^3—$ or $—HET(—R^3, —R^5)—$;

HET is



substituted phenyl, benzyl, 2-phenethyl, and pyridyl mean 1 or 2 substituents on the aromatic ring selected from C_1–C_6 alkyl, R^{10}, NO_2, SCF_3, $—COR^7$, $—COR^{10}$, CN, halogen, and CF_3;

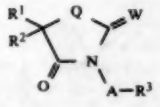
and the pharmaceutically acceptable salts thereof.

4,957,933
FUNGICIDAL OXAZOLIDINONES

Detlef Geffken, Hamburg, Fed. Rep. of Germany, and Rayner Dennis R., Centerville, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 21, 1989, Ser. No. 341,741
Int. Cl.[5] A01N 43/76
U.S. Cl. 514—376 **8 Claims**

1. A method of controlling fungus disease in plants that comprise treating the locus to be protected with a fungicidally amount of a compound of Formula I,



I

wherein:

A is NR^4,

Q is O,

W is O or S,

R^1 is H, C_1 to C_6 alkyl, C_1 to C_6 haloalkyl, C_3 to C_6 cycloalkyl, C_2 to C_6 alkenyl, C_2 to C_6 alkynyl, C_2 to C_6 alkoxyalkyl, C_1 to C_3 alkyl substituted with C_3 to C_6 cycloalkyl, phenyl or benzyl, wherein said phenyl or benzyl ring is substituted on the ring with R6, and the benzylic carbon is substituted with R7;

R^2 is phenyl substituted with R^5 and R^6, naphthyl substituted with 1 to 2 groups selected from R^6,

C_1 to C_2 alkyl substituted with phenoxy or phenylthio, said phenoxy or phenylthio being substituted on the ring with R^6,

C_1 to C_6 alkyl; or

R^3 is phenyl substituted with R^5 and R^6, benzyl substituted on the benzylic carbon with a group selected from R^7 and substituted on the phenyl ring with R^6, naphthyl substituted with R^6,

R^4 is hydrogen, formyl, C_2 to C_4 alkylcarbonyl, C_2 to C_4 haloalkylcarbonyl, C_2 to C_4 alkoxyalkylcarbonyl, C_2 to C_4 alkoxycarbonyl, C_2 to C_5 alkylaminocarbonyl, C_1 to C_4 alkylsulfonyl, C_1 to C_6 alkyl, C_4 to C_6 cycloalkyl, benzyl substituted with R^6 on the phenyl ring and substituted with R^7 on the benzylic carbon, phenylaminocarbonyl where said phenyl is substituted with R^6, C_3 to C_4 alkenyl, C_3 to C_4 alkynyl; or

R^5 is hydrogen, halogen, C_1 to C_6 alyl, C_1 to C_6 haloalkyl, C_1 to C_6 alkoxy, C_3 to C_4 alkenyloxy, C_1 to C_5 alkylthio, C_1 to C_4 haloalkylthio, C_1 to C_4 haloalkoxy, C_1 to C_4 alkylsulfonyl, C_1 to C_4 haloalkylsulfonyl, nitro, phenyl substituted with R^6, phenoxy substituted with R^6, phenylthio substituted with R^6, cyano, C_3 to C_4 alkynyloxy, C_2 to C_6 alkoxyalkyl, C_2 to C_6 alkoxyalkyoxy, phenoxymethyl substituted on the phenyl ring with R^6, benzyloxy substituted on the phenyl ring with R^6, phenethyloxy substituted on the phenyl ring with R^6, phenethyl substituted on the phenyl ring with R^6 or benzyl substituted on the phenyl ring with R^6, phenoxy substituted with R^6, C_2 to C_6 carboalkoxy, C_5 to C_6 cycloalkyl;

R^6 is hydrogen, 1 to 2 halogen, methyl, trifluoromethyl, C_1 to C_4 alkoxy, methylthio and nitro.

4,957,934

1,3-HETEROCYCLIC-SUBSTITUTED ALKANE

Francis T. Boyle, Congleton, England, assignor to Imperial Chemical Industries PLC, London, England

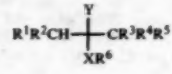
Filed Jul. 13, 1988, Ser. No. 218,255

Claims priority, application United Kingdom, Jul. 15, 1987, 8716651

Int. Cl.[5] C07D *249/08*; A61K *31/41*

U.S. Cl. 514—383 **9 Claims**

1. A heterocyclic compound of the formula I:



wherein R^1 is a triazolyl radical, R^5 is a triazolyl radical; R^2, R^3 and R^4, which may be the same or different, are each a hydrogen atom, a 1–6C alkyl, halogenoalkyl or alkoxy radical, a 3–8C cycloalkyl radical, or a phenyl, naphthyl, phenoxy, naphthyloxy or phenyl(1–6C alkyl) radical, in each of which the aryl group optionally bears one or more substituents selected from the group consistiong of halogen atoms, amino, carboxyamido, cyano and nitro radicals, 1–6C alkyl, halogenoalkyl, alkoxy, halogenoalkoxy and alkylamino radicals, 3–8C cycloalkyl radicals, di(1–6C alkyl)amino radicals and 2–6C alkoxycarbonyl radicals; R^6 *pl is a phenyl or naphthyl radical optionally bearing one or more substituents as defined above; X is a direct bond, a* 1–4C alkylene radical, a 2–4C alkenylene or alkynylene radical, or a 1–4C oxyalkylene or thioalkylene radical wherein respectivly the oxygen or sulphur atom is bonded to R^6 or a phenyl(2–4C-)alkenylene radical in which the phenyl group bears one or more substituents as defined above for R^6; and Y is a halogen atom, and provided that when X is a direct bond, Y is a halogen; and when the compound contains a basic nitrogen atom, pharmaceutically acceptable acid addition salts thereof.

4,957,935

PHENYLTRIAZOLE DERIVATIVE AND INSECTICIDE

Masahito Inamori, Shizuoka; Tetsuo Horii, Fujieda; Tomonori Shimazu, Shizuoka, and Masaji Sugaya, Shizuoka, all of Japan, assignors to Kumiai Chemical Industry Co., Ltd. and Ihara Chemical Industry Co., Ltd., both of Tokyo, Japan

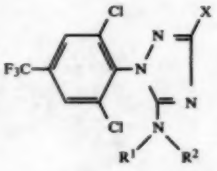
Continuation-in-part of Ser. No. 171,777, Mar. 22, 1988, Pat. No. 4,925,864. This application Jun. 13, 1989, Ser. No. 365,437

Claims priority, application Japan, Mar. 27, 1987, 62-73636; Nov. 11, 1987, 62-284873

Int. Cl.[5] A01N *43/653*; C07D *249/14*

U.S. Cl. 514—383 **21 Claims**

1. A phenyltriazole compound having the formula:



(I)

wherein X is a lower alkyl group having all or a part of hydrogen atoms substituted by fluorine atoms, and each of R^1 and R^2 which may be the same or different, is a hydrogen atom or a lower alkyl group, or R^1 and R^2 form together with the adjacent nitrogen atom a pyrrole ring or an ethoxymethylideneamino group.

4,957,936

GLYCOCYAMIDINE DERIVATIVES

Ko Nakamura, and Kazuharu Ienaga, both of Hyogo, Japan, assignors to Nippon Zoki Pharmaceutical Co., Ltd., Osaka, Japan

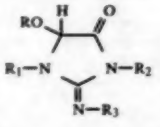
Filed Jan. 30, 1990, Ser. No. 472,494

Claims priority, application Japan, Feb. 1, 1989, 1-24669

Int. Cl.[5] C07D *233/88*; A61K *31/415*

U.S. Cl. 514—389 **4 Claims**

1. A glycocyamidine derivative having the formula (I) or a pharmaceutically acceptable salt thereof:



(I)

wherein R_1, R_2 and R_3, which may be the same or different, is hydrogen or a lower alkyl group, and R is hydrogen or an acetyl group.

4,957,937

SUBSTITUTED N-HYDROXYPYRAZOLES AND FUNGICIDES WHICH CONTAIN THESE COMPOUNDS

Franz Schuetz, Ludwigshafen; Hubert Sauter, Mannheim; Siegbert Brand, Weinheim; Bernd Wenderoth, Lampertheim; Ulf Baus, Dossenheim; Wolfgang Reuther, Heidelberg; Gisela Lorenz, Neustadt, and Eberhard Ammermann, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

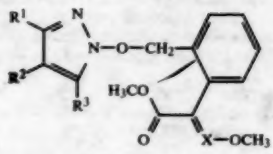
Filed Feb. 12, 1990, Ser. No. 478,963

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1989, 3905948

Int. Cl.[5] A01N *43/56*; C07D *231/12, 231/54, 231/56*

U.S. Cl. 514—407 **8 Claims**

1. Substituted N-hydroxypyrazoles of the general formula I

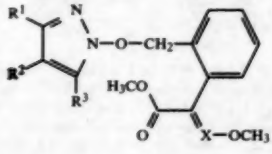


where

R^1, R^2 and R^3 are identical or different and are hydrogen, C_1–C_4-alkyl, C_1–C_2-haloalkyl, C_3–C_6-cycloalkyl, C_1–C_4-alkoxycarbonyl, halogen, aryl or aryl-C_1–C_4-alkyl, the aromatic ring being unsubstituted or substituted by one or more of the following: C_1–C_4-alkyl, C_3–C_6-cycloalkyl, C_1–C_2-haloalkyl, C_1–C_4-alkoxy, halogen, cyano or nitro, or R^2 and R^3 form, with the pyrazole ring, an aromatic or aliphatic ring which is unsubstituted or substituted by C_1–C_4-alkyl,

X is CH or N, and the acid addition salts and metal complexes thereof which are tolerated by plants.

2. A fungicide containing an inert carrier and a fungicidally effective amount of a substituted N-hydroxypyrazole of the general formula I



where

R^1, R^2 and R^3 are identical or different and are hydrogen, C_1–C_4-alkyl, C_1–C_2-haloalkyl, C_3–C_6-cycloalkyl, C_1–C_4-alkoxycarbonyl, halogen, aryl or aryl-C_1–C_4-alkyl, the aromatic ring being unsubstituted or substituted by one or more of the following: C_1–C_4-alkyl, C_3–C_6-cycloalkyl, C_1–C_2-haloalkyl, C_1–C_4-alkoxy, halogen, cyano or nitro, or R^2 and R^3 form, with the pyrazole ring, an aromatic or aliphatic ring which is unsubstituted or substituted by C_1–C_4-alkyl,

X is CH or N, or an acid addition salt or metal complex thereof tolerated by plants.

4,957,938

NUTRITIONAL FORMULATION FOR THE TREATMENT OF RENAL DISEASE

Pamela A. Anderson, Washington Court House; Kent L. Cipollo, Westerville, and Tivadar G. Mohacsi, Columbus, all of Ohio, assignors to Abbott Laboratories, Abbott Park, Ill.

Filed Jun. 21, 1989, Ser. No. 369,163

Int. Cl.[5] A61K *31/40, 37/44*

U.S. Cl. 514—412 **12 Claims**

1. A composition of matter consisting of a mixture of the following components at the following percentages by weight:

L-ornithine-α-ketoisovalerate	21–24%
L-ornithine-α-ketoisocaproate	21–24%
L-lysine-α-keto-β-methylvalerate	21–24%
L-histidine-α-ketoisocaproate	6–8%
calcium, sodium or potassium salt of α-hydroxy-γ-methylthiobutyrate	1.5–2.5%
L-tryptophan	0.2–0.75%
L-tyrosine	16–19%
L-threonine	4–6%.

4,957,939

STERILE PHARMACEUTICAL COMPOSITIONS OF GADOLINIUM CHELATES USEFUL ENHANCING NMR IMAGING

Heinz Gries; Douwe Rosenberg, and Hanns-Joachim Weinmann, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

Division of Ser. No. 573,184, Jan. 23, 1984, Pat. No. 4,647,447, which is a continuation-in-part of Ser. No. 401,594, Jul. 26, 1982, abandoned. This application Jun. 20, 1986, Ser. No. 876,497

Claims priority, application Fed. Rep. of Germany, Jul. 24, 1981, 3129906; Jan. 21, 1983, 3302410; Jan. 11, 1984, 3401052

The portion of the term of this patent subsequent to Mar. 3, 2004, has been disclaimed.

Int. Cl.[5] C07C *229/76;* **C07F** *9/38*

U.S. Cl. 514—492 **32 Claims**

1. A pharmaceutical composition for enhancement of NMR imaging comprising a physiologically compatible gadolinium chelate complex and a pharmaceutically acceptable carrier, wherein said composition is sterile.

4,957,940

BICYCLO HEPTANE AND BICYCLO OCTANE SUBSTITUTED INHIBITORS OF CHOLESTEROL SYNTHESIS

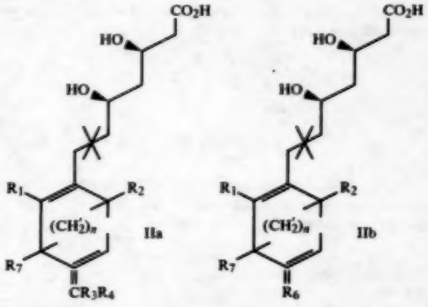
Bruce D. Roth, Ann Arbor, Mich., assignor to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 287,813, Dec. 4, 1988, Pat. No. 4,506,657. This application Nov. 21, 1989, Ser. No. 439,719

Int. Cl.[5] A61K *31/23, 31/20;* **C07C** *69/753, 61/12*

U.S. Cl. 514—557 **7 Claims**

1. A compound of structural Formula IIa or Formula IIb



wherein X is —CH2CH2— or —CH=CH;

R_1 and R_2 independently are alkyl of from one to four carbons;
trifluoromethyl;
cyclohexylmethyl;
phenyl; or
phenyl substituted with
fluorine,
chlorine,
bormine;
hydroxy,
alkyl of from one to four carbon atoms, or
alkoxy of from one to four carbon atoms;

R_3, R_4 and R_7 independently are hydrogen or alkyl of from one to four carbon atoms;

R_6 is alkyl of from one to four carbon atoms or phenyl;

n is the integer 1 or 2; or

a lower alkyl ester or pharmaceutically acceptable salt thereof.

7. A method of inhibiting cholesterol biosynthesis in a patient in need of said treatment comprising administering a cholesterol synthesis inhibiting amount of a compound as

defined by claim 1 in combination with a pharmaceutically acceptable carrier.

4,957,941

ANTI-SPASMDOIC AGENTS HAVING AN ACETYLENIC BOND

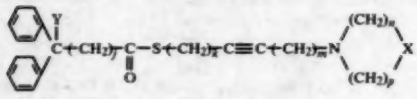
William M. Davis, Tucson, Ariz., assignor to United Pharmaceuticals, Inc., Tucson, Ariz.

Continuation of Ser. No. 120,855, Nov. 16, 1987, abandoned, which is a continuation-in-part of Ser. No. 703,318, Feb. 20, 1985, abandoned. This application Jan. 9, 1990, Ser. No. 463,892

Int. Cl.[5] A61K *31/135, 31/395, 31/40, 31/41, 31/435, 31/495, 31/535, 31/54*

U.S. Cl. 514—648 **18 Claims**

1. A compound of the formula



where

Y is H or OH;

j is an integer from 0 to 4;

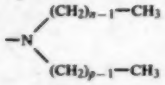
k is an integer from 0 to 4;

m is an integer from 1 to 4;

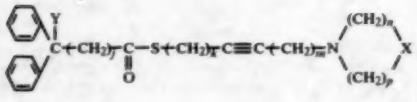
n is an integer from 1 to 4;

p is an integer from 1 to 4; and

X may be nonexistent or may be O, S, NH or CH_2 or salts thereof, but when X is nonexistent the terminal group in both the n-chain and the p-chain is a methyl group, whereby the —N radical is



3. A method of treating a patient suffering smooth muscle spasm comprising administering to the patient an effective amount of a compound having the formula:



where

Y is H or OH;

j is an integer from 0 to 4;

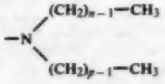
k is an integer from 0 to 4;

m is an integer from 1 to 4;

n is an integer from 1 to 4;

p is an integer from 1 to 4; and

X may be nonexistent or may be O, S, NH, or CH_2 or salts thereof, but when X is nonexistent the terminal group in both the n-chain and the p-chain is a methyl group, whereby the —N radical is



4,957,942

SEMIPERMEABLE MEMBRANE AND PROCESS FOR PREPARING SAME

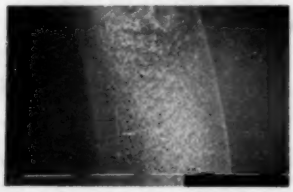
Masashi Yoshida; Katsuhisa Suzuki, and Masaaki Yoshikawa, all of Tokyo, Japan, assignors to Nikkiso Co. Ltd., Tokyo, Japan

Filed May 26, 1989, Ser. No. 358,290

Claims priority, application Japan, May 28, 1988, 63-131013

Int. Cl.[5] C08J *9/28*

U.S. Cl. 521—62 **6 Claims**



1. A process for preparing a semipermeable membrane comprising the step of discharging a stock solution comprising a polyarylate resin and a polysulfone resin in a total amount ranging from 10% to 25% by weight and a core solution comprising water in an amount ranging from 25% to 80% by volume and an organic solvent into a coagulating solution.

4,957,943

PARTICLE-FILLED MICROPOROUS MATERIALS

Jerome W. McAllister, Hudson; Kevin E. Kinzer, Cottage Grove, both of Wis.; James S. Mrozinski, Oakdale; Eric J. Johnson, Woodbury, both of Minn., and James F. Dyrud, New Richmond, Wis., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 14, 1988, Ser. No. 258,314

Int. Cl.[5] C08J *9/28*

U.S. Cl. 521—64 **34 Claims**

1. A method for preparing a particulate-filled microporous thermoplastic polymeric shaped article which comprises the steps of

(a) dispersing submicron or micron-sized particulate filler in a liquid compatible with the thermoplastic polymer to form a colloidal suspension of the particulate filler in the liquid, the particulate filler being substantially non-agglomerated;

(b) melt-blending the thermoplastic polymer with a solubilizing amount of the compatible liquid containing the dispersed particulate filler at a temperature sufficient to form a homogeneous solution;

(c) forming an article from the solution;

(d) cooling the shaped article at a rate and to a temperature sufficient to initiate thermodynamic, non-equilibrium phase separation;

(e) further cooling the article to solidify the thermoplastic polymer; and

(f) removing at least a substantial portion of the compatible liquid, said particulate filler remaining substantially entirely within the thermoplastic polymer article.

4,957,944

URETHANE CATALYSTS

Reinhart Schiffauer, Cross Lanes, W. Va., and Walter Buchmuller, Gutenburg, Switzerland, assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

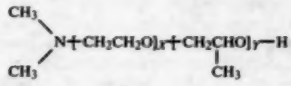
Filed Jun. 16, 1989, Ser. No. 367,266

Int. Cl.[5] C08G *18/14*

U.S. Cl. 521—115 **30 Claims**

1. A process for preparing a polyurethane foam which comprises reacting an organic polyisocyanate, a composition that contains an active hydrogen as measured and determined by

the Zerewitinoff method, and water in the presence of a catalytic amount of a dimethylamino alkyleneoxy isopropanol having the formula:



where X is at least 1 and Y is at least 1.

4,957,945

PREPARATION OF ULTRA HIGH MOLECULAR WEIGHT POLYESTER

Gerald Cohn, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 285,928, Dec. 19, 1988, Pat. No. 4,917,845, which is a continuation-in-part of Ser. No. 176,554, Apr. 1, 1988, Pat. No. 4,792,573. This application Jan. 2, 1990, Ser. No. 459,508

The portion of the term of this patent subsequent to Oct. 24, 2006, has been disclaimed.

Int. Cl.[5] C08G *63/00*

U.S. Cl. 521—182 19 Claims

1. The porous pills made by a process which consists essentially of (1) dissolving a polyester prepolymer in a suitable organic solvent; (2) recovering the polyester prepolymer from the organic solvent to produce a porous, fibrous mass of the polyester prepolymer; and (3) compacting the porous, fibrous mass into the porous pills.

4,957,946

CATIONICALLY POLYMERIZABLE MIXTURES CONTAINING METALLOCENE COMPLEX SALT OF CERTAIN CARBOXYLIC OR SUFFONIC ACIDS

Kurt Meier, Binningen, Switzerland, and Roger P. Salvin, Rhein, Fed. Rep. of Germany, assignors to Ciga-Geigy Corporation, Ardsley, N.Y.

Filed Jun. 3, 1988, Ser. No. 202,739

Claims priority, application Switzerland, Jun. 5, 1987, 2147/87

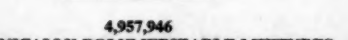
Int. Cl.[5] C08F *2/50, 4/4 R, 16/12;* C08G *59/68*

U.S. Cl. 522—59 10 Claims

1. A mixture containing

(a) an epoxy resin, a vinyl ether or a vinyl ester and

(b) a compound of the formula I



(I)

in which a is 1 or 2, n is 1 or 2, R^1 is a substituted or unsubstituted ζ-arene, R^2 is a substituted or unsubstituted ζ-arene or cyclopentadienyl anion or indenyl anion, q is an integer from 1 to 3 and X is FSO_3^- 3 or a q-valent anion of an organic sulfonic acid or carboxylic acid, subject to the proviso that R^1 can also be a polymeric, aromatic ligand and that in such a case a is a number corresponding to the average number of complexed groups in the polymer ligand.

4,957,947

RADIATION-CURABLE COMPOSITION FOR FORMING AN ABRASION-RESISTANT ANTISTATIC LAYER

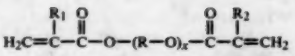
Janglin Chen, Rochester, and Billy R. Dotson, Spencerport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jun. 17, 1988, Ser. No. 207,816

Int. Cl.[5] G03C *1/82;* C08F *216/12*

U.S. Cl. 522—66 12 Claims

1. A radiation-curable composition useful in forming an abrasion-resistant antistatic layer, said composition consisting essentially of an alkali metal salt dissolved in a mixture of (1) a poly(alkylene glycol) diacrylate of the formula:



wherein R is an alkylene radical of 2 to 4 carbon atoms, R_1 and R_2 are independently H or CH_3, and x is an integer having a value of from 3 to 50, and (2) an acrylic monomer containing at least three acrylic ester groups; said composition containing about 2 to about 20% by weight of said salt, about 15 to about 70% by weight of said poly(alkylene glycol) diacrylate and about 20 to about 80% by weight of said acrylic monomer.

4,957,948

BIOCIDAL PROTECTIVE COATING FOR HEAT EXCHANGER COILS

Claude E. Terry, Kennesaw, Ga., and Robert H. McIntosh, Sr., Greensboro, N.C., assignors to Interface, Inc., Atlanta, Ga.

Continuation-in-part of Ser. No. 190,370, May 5, 1988, Pat. No. 4,908,209, which is a continuation-in-part of Ser. No. 47,561, Apr. 27, 1987, which is a continuation-in-part of Ser. No. 781,710, Oct. 2, 1985, which is a continuation-in-part of Ser. No. 635,728, Oct. 9, 1984, abandoned, which is a continuation-in-part of Ser. No. 713,445, Mar. 19, 1985, abandoned, which is a continuation-in-part of Ser. No. 736,652, May 21, 1985, Pat. No. 4,647,601, which is a continuation-in-part of Ser. No. 744,730, Jun. 13, 1985, abandoned, which is a continuation-in-part of Ser. No. 570,952, Mar. 8, 1984, Pat. No. 4,608,259, which is a continuation of Ser. No. 523,734, Aug. 16, 1983, abandoned, which is a continuation of Ser. No. 226,006, Nov. 9, 1981, abandoned, which is a continuation of Ser. No. 930,879, Aug. 4, 1978, abandoned. This application Sep. 9, 1988, Ser. No. 242,484

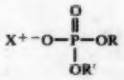
Int. Cl.[5] B05D *1/18, 3/02*

U.S. Cl. 523—122 33 Claims

1. A coating for heat exchangers, comprising:

(a) a water resistant organic polymeric material, wherein the material bonds to the surface of a heat exchanger; and

(b) a biocidally effective amount of a substituted phosphoric acid of the general formula



wherein X is selected from the group consisting of organic ions, H^+Group I metals, Group II metals and transition metals, R and R' are selected from the group consisting of hydrocarbons and substituted hydrocarbons having not more than 24 carbon atoms, one of R or R, can be H, and there is at least one free hydroxyl group.

4,957,949

THERMOCHROMIC COLOR MASTERBATCH

Masayasu Kamada, Kusatsu; Toshihisa Maeda, Uji; Tadashi Kobayashi, Kyoto, and Goro Shimizu, Ootsu, all of Japan, assignors to Matsui Shikiso Chemical Co., Ltd., Kyoto, Japan

Filed Oct. 28, 1988, Ser. No. 263,755

Claims priority, application Japan, Oct. 29, 1987, 62-274785; Jul. 25, 1988, 63-186137

Int. Cl.[5] C08K *9/04;* C08L *91/06*

U.S. Cl. 523—201 13 Claims

1. A thermochromic color masterbatch for use in a thermoplastic resin comprising a wax having substantially homogeneously dispersed therein a thermochromic granular material, said thermochromic granular material being a mixture of a thermochromic composition comprising 2 to 20% by weight of an electron donating chromogen, 4 to 40% by weight of an electron acceptor, and an alcohol, ester, azomethine or amide solvent having a boiling point 150° C. or higher, with 10 to 40 parts by weight of a thermosetting resin per 100 parts by

weight of said thermochromic composition, said thermochromic granular material being coated with about 5–30 parts by weight per 100 parts by weight of said thermochromic composition with a hydrophilic high-molecular weight substance coagulable by means of an acid, an alkaline electrolyte, a heavy metal, an aldehyde or a zwitterion; said masterbatch containing 100–500 parts by weight of said wax per 100 parts by weight of said thermochromic granular material.

4,957,950

FLAME-RETARDANT POLYMER COMPOSITIONS

Horst Staendeke, Lohmar, Fed. Rep. of Germany, and Daniel Scharf, East Greenwich, R.I., assignors to Hoechst Aktiengesellschaft, Hurth Knapsack, Fed. Rep. of Germany

Filed Sep. 9, 1988, Ser. No. 243,324

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1987, 3732377

Int. Cl.[5] C08K *7/14, 9/04, 3/32, 3/22*

U.S. Cl. 523—205 **20 Claims**

1. A flame-retardant unsaturated polyester resin composition, containing a flame-retardant system comprised of 5 to 45 parts by weight ammonium polyphosphate per 100 parts by weight polymer, 50 to 175 parts by weight of aluminum hydroxide per 100 parts by weight polymer and at least 1 to 25 parts by weight of a synergetically active component selected from the group consisting of organic nitrogen compounds, polyalcohols, derivatives of polyalcohols and combinations of said synergetically active components per 100 parts by weight of polymer; said ammonium polyphosphate containing 0.5 to 25 weight % of a water-insoluble synthetic resin encapsulating the individual ammonium polyphosphate particles; said organic nitrogen compounds being selected from the group consisting of melamine, cyanuric acid, isocyanuric acid and derivatives thereof and a condensation product of ethylene, urea and formaldehyde; said polyalcohol being selected from the group consisting of pentaerythritol, dipentaerythritol and derivatives thereof; and said aluminum hydroxide and the combination of ammonium polyphosphate and synergetically active component being contained in a ratio by weight of 1:1 to 15:1.

4,957,951

PROCESS TO MANUFACTURE A REACTION RESIN CEMENT BUILDING MATERIAL MIXTURE

Heiaz Marohn, Am Eichenkamp 13, D-4150 Krefeld, Fed. Rep. of Germany

Filed Jun. 30, 1986, Ser. No. 880,171

Claims priority, application Fed. Rep. of Germany, Jul. 1, 1985, 3523479

Int. Cl.[5] C08K *3/34;* **C08L** *63/00*

U.S. Cl. 523—401 **9 Claims**

1. A process for the manufacture of a building material from reaction materials in the form of a storage stable premix which comprises:

preparing a dry premix (A) by first coating aggregate material with a liquid epoxy resin by mixing said resin with said aggregate material under conditions such that the epoxy resin is deposited on and adhered to the surface of the aggregate;

coating the resulting epoxy coated aggregate with a pulverized aggregate powder thereby covering the epoxy coated aggregate;

preparing a dry mix (B) by coating aggregate material with an epoxy resin hardener such that a film of the hardener is deposited on and adhered to the surface of the aggregate material and then coating the resultant hardener coated aggregate with a pulverized aggregate powder whereby a covering film is formed over the epoxy resin hardener coated aggregate; and,

mixing premix (A) with premix (B) to form said building material.

2. In a process for the manufacture of a building material from reaction materials including an epoxy resin component and an epoxy resin hardener component and aggregate, the improvement which comprises:

utilizing a premix component formed by cooling either a liquid epoxy resin or a liquid epoxy resin hardener or both separately until solid;

grinding either of said resultant solidified epoxy resin or solidified epoxy resin hardener or both to a powder; and,

contacting the resultant epoxy resin powder or epoxy resin hardener powder, or both, with pulverized aggregated for forming a cooating over said epoxy resin or epoxy resin hardener or both.

4,957,952

ANIONIC ELECTROCOAT COMPOSITIONS CONTAINING EPOXY PHOSPHATES

Kazys Sekmakas, St. Petersburg Beach, Fla., and Aurelio Parenti, Norridge, Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Continuation of Ser. No. 847,535, Apr. 3, 1986, abandoned. This application Feb. 21, 1990, Ser. No. 485,773

Int. Cl.[5] C08G *59/14;* **C08L** *63/00*

U.S. Cl. 523—402 **9 Claims**

1. A thermosetting aqueous anionic electrocoating composition comprising, a carboxyl-functional anionic polymer dispersed in water with the aid of water miscible organic solvent and a volatile base, and from about 1% to about 5%, based on the weight of the polymer content of the composition, of an oxirane-free epoxy phosphate, said epoxy phosphate being produced by slowly and incrementally adding a resinous polyepoxide to a solvent solution containing from 0.05 to 0.9 mole of orthophosphoric acid per oxirane equivalent in said polyepoxide together with sufficient water to hydrolyze all of the oxirane functionality which is not consumed by said orthophosphoric acid.

4,957,953

STABILIZED SYNTHETIC RESIN COMPOSITION

Kazumi Kikkawa, and Hiroshi Takahashi, both of Saitama, Japan, assignors to Adeka Argus Chemical Co., Ltd., Tokyo, Japan

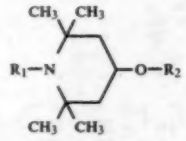
Filed Nov. 30, 1989, Ser. No. 278,189

Claims priority, application Japan, Dec. 11, 1987, 62-313843

Int. Cl.[5] C08K *5/34*

U.S. Cl. 524—99 **15 Claims**

1. A stabilized synthetic resin composition obtained by adding (1) 0.01 to 5 parts by weight of at least one monopiperidine compound represented by the following general formula (I):



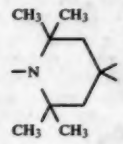
(I)

wherein

R_1 represents an alkyl group, an oxyl group or an acyl group, and

R_2 represents an aliphatic monoacyl group carrying 12 to 30 carbon atoms,

and (2) 0.001 to 5 parts by weight of at least one polypiperidine compound having two or more tetramethylpiperidyl groups represented by the following general formula (II) per molecule:



(II)

to 100 parts by weight of a synthetic resin.

4,957,954

STABILIZER COMPOSITIONS FOR POLYVINYL CHLORIDE RESINS AND STABILIZED POLYVINYL CHLORIDE RESIN COMPOSITIONS

Shunichi Iizuka, Tatebayashi; Yoshiyuki Sakamaki, Toyonaka, and Noriyuki Shimoyama, Urawa, all of Japan, assignors to Adeka Argus Chemical Co., Ltd., Urawa, Japan

Division of Ser. No. 896,475, Aug. 13, 1986, abandoned. This application Jan. 25, 1989, Ser. No. 301,930

Claims priority, application Japan, Aug. 13, 1985, 60-178323

Int. Cl.[5] C08K 5/3435, 3/10, 3/28

U.S. Cl. 524—102 18 Claims

1. A polyvinyl chloride resin composition having improved resistance to deterioration when exposed to heat and light comprising a polyvinyl chloride resin and a stabilizer composition capable of improving the resistance to deterioration of polyvinyl chloride resins when exposed to light and heat, comprising a 2,2,6,6-tetramethyl piperidinyl compound and an ammonium amine, or metal perchlorate selected from the group consisting of ammonium perchlorates and tertiary amine perchlorates; alkali metal perchlorates, alkaline earth metal perchlorates and aluminum perchlorates.

4,957,955

PLASTISOLS BASED ON STYRENE/ACRYLONITRILE COPOLYMERS

Wolfgang Saur; Herbert Schreiber, both Freienbach, Switzerland; Günter Hilken, Cologne, and Rolf Peter, Dormagen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Continuation of Ser. No. 094,903, Sep. 10, 1987, abandoned. This application Dec. 12, 1988, Ser. No. 283,205

Claims priority, application Switzerland, Sep. 22, 1986, 03806/86; Oct. 17, 1986, 04159/86

Int. Cl.[5] C08K 5/15

U.S. Cl. 524—114 7 Claims

1. A plasticol comprising 80 to 5% by weight of a plasticizer where the plasticizer is a liquid selected from an ester of phthalic acid, adipic acid, sebacic acid, azelaic acid, citric acid or phosphoric acid; a chlorinated hydrocarbon; a polyester or an expoxidized natural oil and 20 to 95% by weight of a particulate polymer containing

(a) from 5 to 60% by weight acrylonitrile, methacrylonitrile or mixtures thereof,

(b) from 15 to 95% by weight styrene, α-methyl styrene or mixtures thereof,

(c) from 0 to 10% by weight of acarboxylic acid copolymerizable with the monomers (a) and (b),

(d) from 0 to 30% by weight of an alkylester of acrylic acid, methacrylic acid or mixtures thereof, with the proviso that when there is 0% by weight (c), there is from 10 to 30% by weight (d), the percentages by weight of plasticizer and polymer being based on the sum of plasticizer and polymer.

4,957,956

SOLID STABILIZER COMPOSITION FOR ORGANIC POLYMERS, AND PROCESS FOR PREPARING IT

Carlo Neri, San Donato Milanese; Nereo Nodari, Spino D'Adda; Erik Bersanetti, Milan, and Giovanni Sandre, San Donato Milanese, all of Italy, assignors to Enichem Synthesis S.p.A., Palermo, Italy

Filed Feb. 11, 1988, Ser. No. 154,916

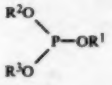
Claims priority, application Italy, Feb. 13, 1987, 19366 A/87; Feb. 13, 1987, 19368 A/87

Int. Cl.[5] C08K 5/49, 5/53, 5/513, 5/09

U.S. Cl. 524—120 18 Claims

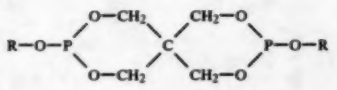
1. A stabilizing composition for organic polymers, composed of a solid continuous phase and another solid continuous phase dispersed in the former, characterized in that said former continuous phase consists of amorphous tetrakis-[3-(3,5-di-tert.-butyl-4-hydroxyphenyl)-propionyloxy-methyl]methane, and the dispersed phase is selected from among:

(a) an either amorphous or crystalline organic phosphite, in the form of particles with a particle size comprised within the range of from 10 μm to 2 mm, with said organic phosphite having a melting point higher than the melting point of said tetrakis-[3-(3,5-di-tert.-butyl-4-hydroxyphenyl)-propionyl-oxy-methyl]methane, and being selected from those definable by the general formula:

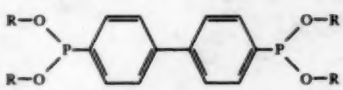


wherein: R^1, R^2 and R^3 represent either equal or different hydrocarbyl radicals, which can be alkyl, cycloalkyl, aryl, alkaryl or aralkyl radicals; the weight ratio of said continuous phase to said dispersed phase, in said composition, being furthermore comprised within the range of from 9:1 to 1:9, or

(b) an either amorphous or crystalline organic phosphite, in the form of particles with a particle size comprised within the range of from 50 μm to 2 mm, with said organic phosphite having a melting point higher than approximately 100° C., and being selected from those definable by the general formulae:



and



wherein: the R radicals independently represent alkyl, cycloalkyl, aryl, alkaryl or aralkyl radicals; the weight ratio of said continuous phase to said dispersed phase, in said compositions, being furthermore comprised within the range of from 9:1 to 1:9.

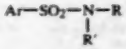
4,957,957

POLYMER COMPOSITIONS CONTAINING AROMATIC SULFONAMIDE

Robert A. Schleifstein, Baton Rouge, La., and David S. Pietrewicz, Elgin, S.C., assignors to Ethyl Corporation, Richmond, Va.

Filed Jun. 1, 1989, Ser. No. 359,528
Int. Cl.[5] C08K 5/43
U.S. Cl. 524—169 9 Claims

1. A polyamide or polyolefin polymer composition containing a polybromoaromatic sulfonamide in quantity sufficient to improve the melt flow properties of the polymer, wherein the sulfonamide is represented by the general formula



where Ar is a bromoaromatic group having at least three bromine atoms bonded to the ring system and each R is a hydrocarbon group and each R′ is hydrogen or a hydrocarbon group.

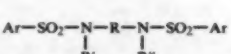
4,957,958

AROMATIC BIS SULFONAMIDE-CONTAINING NYLON OR POLYESTER

Robert A. Schleifstein, Baton Rouge, LA, assignor to Ethyl Corporation, Richmond, VA.

Filed May 23, 1989, Ser. No. 355,559
Int. Cl.[5] C08K 5/43
U.S. Cl. 524—169 11 Claims

1. A polyamide or polyester polymer containing an aromatic bis-sulfonamide wherein the aromatic bis-sulfonamide is represented by the general formula



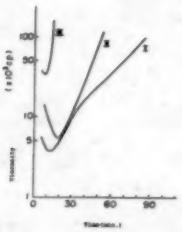
where each Ar group is a mononuclear aryl group having 6 to 10 carbon atoms and from 1 to 5 bromine atoms, R is an alkylene, a cycloalkylene, or an arylene group having from 6 to 10 carbon atoms, and R′ and R″ are identical to each other and are hydrogen or alkyl groups each having up to 12 carbon atoms.

4,957,959

PREPOLYMER COMPOSITION, PROCESS FOR ITS PRODUCTION, AND ITS USE

Yukio Matsumoto, and Nobuaki Kunii, both of Yokohama, Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan

Filed Apr. 26, 1989, Ser. No. 343,373
Claims priority, application Japan, Apr. 26, 1988, 63-101225
Int. Cl.[5] C08L 75/04
U.S. Cl. 524—196 27 Claims



1. A prepolymer composition which comprises 10 to 95% by weight of a first isocyanate-group-containing prepolymer (A) obtained by reacting an excess equivalent of an aromatic diisocyanate (c) containing an isocyanate group directly bonded to the aromatic nucleus with an oxyethylene-group-containing polyoxyalkylene polyol (a) of a relatively high molecular weight; 90 to 5% by weight of a second isocyanate-group-containing prepolymer (B) obtained by reacting an excess equivalent of an organic diisocyanate (d) not containing an isocyanate group directly bonded to the aromatic nucleus with an oxyethylene-group-containing polyoxyalkylene polyol (b) of a relatively high molecular weight; and, as the case may be, an unreacted substance of diisocyanate which has been used in the production of said respective prepolymers (A) and (B), said prepolymer composition containing the isocyanate group in a range of from 3 to 15% by weight,

wherein said polyoxyalkylene polyol (a) and said polyoxyalkylene polyol (b) are either same or different each other, each consisting of at least one polyoxyalkylene polyol, and wherein said polyoxyalkylene polyol (a) and said polyoxyalkylene polyol (b) in total contain functional groups in an average number of above 2 but below 3 and have an average hydroxyl value of from 30 to 80 and an average content of the oxyethylene group of from 70 to 95% by weight.

4,957,960

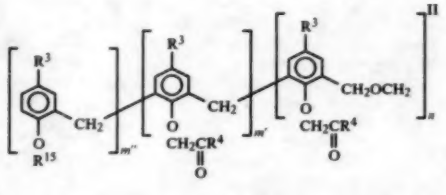
ENCAPSULATING COMPOSITIONS

Stephen J. Harris; John G. Woods, both of Dublin, Ireland; John M. Rooney, Basking Ridge, N.J.; Marueen G. MacManus, Dublin, and John Guthrie, Naas, both of Ireland, assignors to Loctite (Ireland) Ltd., Dublin, Ireland

Division of Ser. No. 270,136, Nov. 14, 1988, Pat. No. 4,908,399, which is a continuation of Ser. No. 100,494, Sep. 24, 1987, abandoned, which is a continuation-in-part of Ser. No. 870,677, Jun. 4, 1986, Pat. No. 4,699,966, which is a continuation-in-part of Ser. No. 717,251, Mar. 28, 1985, Pat. No. 4,642,362, and Ser. No. 673,621, Nov. 21, 1984, Pat. No. 4,556,700, which is a continuation-in-part of Ser. No. 575,257, Jan. 30, 1984, abandoned, said Ser. No. 100,494, is a continuation-in-part of Ser. No. 88,945, Aug. 24, 1987, Pat. No. 4,866,198, which is a continuation-in-part of Ser. No. 914,691, Oct. 2, 1986, Pat. No. 4,718,966, which is a division of Ser. No. 776,536, Sep. 16, 1985, Pat. No. 4,636,539, which is a division of Ser. No. 673,621,. This application Jan. 30, 1990, Ser. No. 472,596
Claims priority, application Ireland, Sep. 29, 1986, 2567/86
The portion of the term of this patent subsequent to Oct. 13, 2004, has been disclaimed.
Int. Cl.[5] C08K 3/20
U.S. Cl. 524—243 15 Claims

1. A curable composition suitable for the encapsulation of electronic devices, said composition comprising a curable silicone resin and an ion scavenger in an amount effective for reducing the level of metal ion, chloride ion or both metal ion and chloride ion extractables from said composition, said ion scavenger selected from the group consisting of:

(A) Calixarene or oxacalixarene derivatives represented by the formula



wherein

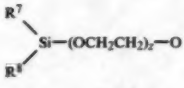
$m'+m''=0$–8;

$n=0$–8;

$m'\cong\frac{1}{2}(m'+m'')$;

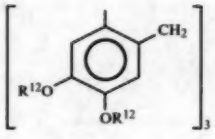
$3 \leqq m'+m''+n \leqq 8$;
if $n=0$, $m'+m'' \geqq 4$;
the R^3 groups are the same or different and are H, halogen, or hydrocarbyl or a substituted derivative thereof;
R^4 is hydrocarbyl, hydrocarbyloxy or a substituted derivative thereof; or R^4 is

wherein
R^5 and R^6 are the same or different and are H or hydrocarbyl or a substituted derivative thereof;
R^{15} is H or hydrocarbyl or a substituted derivative thereof;
the calixarene or oxacalixarene derivative being present as a compound per se or being bound into the polymer network of the polymeric material;
(B) Silacrowns represented by the formula



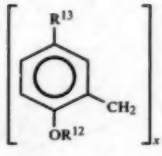
III

wherein R^7 and R^8 are the same or different and are hydrocarbyl, hydrocarbyloxy, or a nitrogen-substituted or other substituted derivative thereof; z is 3–6; and
(C) Polyalkylene ether derivatives represented by the formulae



V

or



VI

wherein
R^{12} is $-(R^{10}-O)_q-R^{11}$;
q is an integer of from 2 to 25;
R^{10} is a substituted or unsubstituted alkyl residue having 2 to 6 carbon atoms, the $(R^{10}-O)$ groups containing the same alkyl residue or containing different alkyl residues distributed on the chain in a random or block manner;
R^{11} is hydrogen, hydrocarbyl or a substituted derivative thereof;
R^{13} is hydrogen, halogen, or hydrocarbyl or a substituted derivative thereof; and
X is an integer from 4 to 8.

4,957,961

MODIFIED FLUOROPOLYMERS FOR LOW FLAME/LOW SMOKE PLENUM CABLES

Swayambu Chandrasekaran, Mountain Lakes; Nikhil K. Kundel, Piscataway; Brij Garg, Succasunna, and Hong B. Chin, Parsippany, all of N.J., assignors to Ausimont, U.S.A., Inc., Morristown, N.J.

Filed Mar. 30, 1989, Ser. No. 332,398
Int. Cl.[5] C08K *3/22*; C08L *27/12*
U.S. Cl. 524—405 **24 Claims**

1. A composition for insulating or jacketing wires or cables comprising from about 90 wt. % to about 99.8 wt. % of a fluorinated polymer and from about 0.2 wt. % to about 10 wt. % of zinc borate[$ZnCO_3$].

4,957,962

FIBER COMPOSITES

Matthias Winkler; Peter Ittemann, both of Ludwigshafen, and Gerhard Heinz, Weisenheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Nov. 14, 1988, Ser. No. 271,238
Claims priority, application Fed. Rep. of Germany, Nov. 14, 1987, 3738749
Int. Cl.[5] C08K *7/04, 7/14*; C08L *61/18, 77/00*
U.S. Cl. 524—538 **10 Claims**

1. A fiber reinforced composite containing:
(1) from 80 to 30% by volume of oriented continuous reinforcing fibers, and
(2) from 20 to 70% by volume of a highly heat-resistant thermoplastic mixture containing from 90 to 40% by weight of a polyether sulfone and from 10 to 60% by weight of one or more of a polyether ketone containing only oxo- and keto-bridging groups.

4,957,963

SILICONE WATER BASED ELASTOMERS

Stephanie A. Burns; Donald T. Liles, and Christine J. Schoenherr, all of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Continuation of Ser. No. 229,206, Aug. 5, 1988, abandoned. This application Aug. 30, 1989, Ser. No. 401,485
Int. Cl.[5] C08L *83/07, 83/06*; C08K *3/36*
U.S. Cl. 524—837 **4 Claims**

1. An aqueous silicone emulsion which cures to a reinforced elastomer upon removal of the water comprising
(A) an aqueous, anionic emulsion of crosslinkable hydroxy terminated polydiorganosiloxane having a molecular weight of greater than 50,000,
(B) an anionic, stable dispersion of fumed silica in water, and
(C) sufficient vinyl trialkoxy silane crosslinking system for (A).

4,957,964

THERMOPLASTIC RESIN COMPOSITION

Ryozo Okumura; Eiichi Terada, both of Sodegaura, and Shigemi Kawazoe, Ichihara, all of Japan, assignors to Idemitsu Petrochemical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 228,784, Aug. 4, 1988, abandoned, which is a continuation of Ser. No. 838,756, Mar. 12, 1986, abandoned. This application Feb. 14, 1990, Ser. No. 481,662
Claims priority, application Japan, Mar. 29, 1985, 60-63692
Int. Cl.[5] C08L *51/04*
U.S. Cl. 525—64 **6 Claims**

1. A thermoplastic resin composition which comprises:
(A) from 50 to 90 parts by weight of a copolymer of styrene and maleic anhydride which contains from 1 to 30% by weight maleic anhydride;
(B) from 50 to 10 parts by weight of a thermoplastic resin which is a copolymer of 60% to 90% by weight of butadiene rubber, 40% to 2% by weight styrene and 40% to 2% by weight of methyl methacrylate; and

(C) from 0.01 to 1.0 parts by weight of an organopolysiloxane having a viscosity of from 10 to 100,000 centistokes at 30° C. which is selected from the group consisting of dimethyl polysiloxanes, methyl phenyl polysiloxanes and diphenyl polysiloxanes.

4,957,965

THERMOPLASTIC MOLDING MATERIALS

Christof Taubitz, Wachenheim; Klaus Muehlbach, Heppenheim; Hermann Brandt, Schifferstadt, and Klaus Boehlke, Hesheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Aug. 5, 1988, Ser. No. 228,720

Claims priority, application Fed. Rep. of Germany, Aug. 7, 1987, 3726283

Int. Cl.[5] C08L *71/12, 77/00*

U.S. Cl. 525—66 **4 Claims**

1. A thermoplastic molding material containing, as essential components,

(A) 5–95% by weight of a polyamide,

(B) 5–95% by weight of a modified polyphenylene ether, prepared from

(b_1) 4.95–99.9% by weight of a polyphenylene ether,

(b_2) 90% or less by weight of a vinylaromatic polymer,

(b_3) 0.05 –10% by weight of

(b_{31}) an α,β-unsaturated dicarbonyl compound,

(b_4) 0–80; by weight of further graft-active monomers and

(b_5) 0.01–0.09% by weight of a free radical initiator.

4,957,966

THERMOPLASTIC RESIN COMPOSITION

Taichi Nishio; Hiroomi Abe; Yasurou Suzuki; Takashi Sanada; Satoru Hosoda, all of Chiba, and Takayuki Okada, Ehime, all of Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan

Filed Jun. 7, 1988, Ser. No. 203,187

Claims priority, application Japan, Jun. 10, 1987, 62-145463

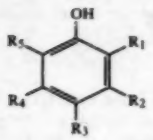
Int. Cl.[5] C08L *71/12, 77/00*

U.S. Cl. 525—66 **9 Claims**

1. A thermoplastic resin composition comprising a matrix of polyamide resin (E) and a disperse phase of a composition (D) which is obtained by melting and mixing the composition (D) and the polyamide resin (E),

said composition (D) being obtained by melting and mixing a polyphenylene ether (A) together with a rubber-like material (B) and a mutual compatibilizer (C).

said polyphenylene ether (A) being obtained by oxidation polymerization of at least one phenol compound represented by the formula:



wherein R_1, R_2, R_3, R_4 and R_5 represent a hydrogen atom, a halogen atom or a substituted or unsubstituted hydrocarbon residue, with a proviso that at least one of them is a hydrogen atom, and said polyphenylene ether (A) having a reduced viscosity $\eta_{sp/c}$ of 0.40–0.58 deciliter/gram,

said mutual compatibilizer (C) being reactive with said polyphenylene ether and reactive with said polyamide resin, and

said polyamide resin (E) having a number average molecular weight of 14,000–30,000 and an end amino group content of 50–90 mmole/kg,

wherein the thermoplastic resin composition constitutes 1–65 wt. % of said polyphenylene ether (A), 1–20 wt. % of said rubber-like material (B), 0.01–5 wt. % of said mutual compatibilizer (C) and 35–97.99 wt. % of said polyamide resin (E), based on the total weight of said thermoplastic resin composition, and the weight average particle size of said disperse phase is 2 microns or less.

4,957,967

THERMOPLASTIC RESIN COMPOSITION

Yukio Mizuno, and Takashi Maruyama, both of Chiba, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Jun. 22, 1989, Ser. No. 370,334

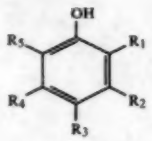
Claims priority, application Japan, Jun. 30, 1988, 63-165376

Int. Cl.[5] C08L *71/12, 61/28, 67/02*

U.S. Cl. 525—68 **5 Claims**

1. A thermoplastic resin composition which comprises:

(A) 100 parts by weight of a composition comprising 95–5% by weight of a polyphenylene ether obtained by oxidation polymerization of at least one phenol compound represented by the following formula:



wherein R_1, R_2, R_3, R_4 and R_5 (which may be identical or different), each represents a hydrogen atom, a halogen atom, a hydrocarbon radical or a substituted hydrocarbon radical and at least one of them is a hydrogen atom, and 5–95% by weight of a thermoplastic polyester which is a polycondensation product of a dicarboxylic acid or its functional derivative and a dioxy compound or its functional derivative, and

(B) 0.01–10 parts by weight of an amino resin obtained by modifying, with an alcohol, an addition reaction product of formaldehyde and at least one compound selected from the group consisting of melamine, guanamine and urea.

4,957,968

ADHESIVE THERMOPLASTIC ELASTOMER BLENDS

Ashok M. Adur, Hackettstown, N.J., and Robert C. Constable, Bangor, Pa., assignors to Monsanto Company, St. Louis, Mo.

Filed Aug. 9, 1988, Ser. No. 230,192

Int. Cl.[5] C08L *51/06, 23/26*

U.S. Cl. 525—74 **9 Claims**

1. An adhesive thermoplastic elastomer composition consisting essentially of:

(a) about 15 to 40 weight percent of at least one polyolefin selected from the group consisting of polyethylene, polypropylene and mixtures thereof, modified by grafting with an unsaturated an aliphatic carboxylic acid or its derivatives selected from the group consisting of acid anhydride, acid chloride, isocyanate, oxazoline, epoxide, amine and hydroxide;

(b) about 10 to 70 weight percent of at least one other non-elastomeric polyolefin resin prepared from at least one monomer selected from the group consisting of: butene, isobutylene, octene-1, 4-methyl pentene-1, ethylene, propylene, hexene-1 or mixtures thereof; and

(c) about 20 80 weight percent of at least one partially cured olefinic elastomer, selected from the group consisting of elastomeric ethylene-propylene copolymer, elastomeric ethylene-propylene copolymers, elastomeric ethylene-propylene terpolymers, polyisoprene, polyisobutylene, polybutadiene, and natural rubber;

wherein said partial cure of the elastomer is attained by a curing agent comprising about 1 to 99 percent of the amount necessary for a substantially complete cure.

4,957,969

IMPROVED BLENDS OF LINEAR LOW DENSITY ETHYLENE COPOLYMERS

Pradeep P. Shirodkar, Somerset, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 10, 1989, Ser. No. 295,430

Int. Cl.[5] C08L *23/18, 55/02, 23/08*

U.S. Cl. 525—86 **19 Claims**

1. A film-forming polymer blend comprising, as the polymeric components, at least 50 wt. % of a linear low density copolymer of ethylene with an olefin containing 4 to 10 carbon atoms, and about 1 to 25 wt. % in an amount to improve antiblocking properties of an ABS resin, based on the total polymer content of the blend.

4,957,970

PACKAGE FOR COMPOUNDING RUBBER AND COMPOUNDED RUBBER

Ronald L. Holsapple, Uniontown, and John A. Kay, Stow, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jan. 23, 1989, Ser. No. 299,869

Int. Cl.[5] C08L *7/00, 9/00, 9/02, 9/06*

U.S. Cl. 525—99 **3 Claims**

1. A compounded rubber prepared from a mixture of a package of compounding ingredients for unvulcanized sulfur curable rubber and unvulcanized sulfur curable rubber wherein said package comprises sulfur curable compounding ingredients for unvulcanized rubber packaged in a protective film having a thickness in the range of about 0.5 to about 5 mils and comprising an unvulcanized syndiotactic-1,2-polybutadiene (SPBD) having at least 90 percent of its monomeric units in a syndiotactic-1,2-configuration and having a melting point in the range of about 70° C. to about 100° C. and, based on 100 parts by weight of said SPBD, about 1 to about 5 parts by weight sulfur, about 0.5 to about 3 parts by weight of at least one rubber cure accelerator and about 0.1 to about 2 parts by weight of at least one rubber cure retarder.

4,957,971

TRANS-6-(2-(N-HETEROARYL-3,5-DISUBSTITUTED)-PYRAZOL-4-YL)-ETHYL)-OR ETHENYL)TETRAHYDRO-4-HYDROXYPYRAN-2-ONE INHIBITORS OF CHOLESTEROL BIOSYNTHESIS

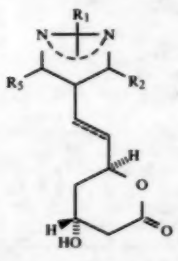
Joseph A. Picard; Bruce D. Roth, both of Ann Arbor, and Drago R. Sliskovic, Ypsilanti, all of Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 48,473, May 18, 1987, Pat. No. 4,808,621, which is a continuation-in-part of Ser. No. 882,327, Jul. 7, 1986, abandoned. This application Dec. 6, 1988, Ser. No. 280,756

Int. Cl.[5] C07D *403/04, 405/06;* **A61K** *31/495, 31/505*

U.S. Cl. 514—252 **7 Claims**

1. A compound of structural formula I

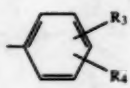


I

wherein R_1 is 2-, 4-, or 5-pyrimidinyl; or 2-pyrazinyl; and wherein R_1 is attached to one of the nitrogen atoms of the pyrazole nucleus;

R_2 is alkyl of from one to three carbon atoms or trifluoromethyl;

R_5 is a saturated carbocyclic ring of from four to seven carbon atoms optionally substituted with alkyl of from one to three carbon atoms; 2-norbornyl; 2-norbornenyl; bicyclo[2.2.2]octyl; or



wherein R_3 is alkyl of from one to three carbon atoms, chlorine or fluorine, and R_4 is hydrogen, alkyl of from one to three carbon atoms, chlorine, or fluorine;

or a ring-opened hydroxy acid or ester derived therefrom, N-oxides thereof or a pharmaceutically acceptable salt thereof.

4,957,972

BLENDS OF LINEAR LOW DENSITY ETHYLENE COPOLYMERS

Pradeep P. Shirodkar, Somerset, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 3, 1988, Ser. No. 266,957

Int. Cl.[5] C08L *23/20, 23/18, 23/08*

U.S. Cl. 525—240 **17 Claims**

1. A polymer blend comprising polymers consisting of a linear low density copolymer of ethylene with an olefin containing 4 to 10 carbon atoms and about 2 to 10 wt. % of an at least partially isotactic, partially crystalline butene-1 polymer comprising at least about 80 wt. % of polymerized butene-1.

4,957,973

UNCATALYZED PROCESS FOR PREPARING "LIVING" POLYMERS

Dotsevi Y. Sogah, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 883,320, Jul. 8, 1986, abandoned. This application Sep. 22, 1987, Ser. No. 99,745

Int. Cl.[5] C08F *293/00, 30/08*

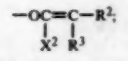
U.S. Cl. 525—280 **18 Claims**

1. Polymerization process for preparing a "living" polymer, said process comprising contacting at least one polar acrylic or maleimide monomer with a tetracoordinate organosilicon polymerization initiator having at least one initiating site in the absence of a co-catalyst and at a pressure greater than about 50 MPa, wherein the initiator is of the formula $(Q')_3MZ^1$, $(Q')_2M(Z^1)_2$ $(Z^1(Q')_2M)_2O$ or $(Q')_3MZ^2$ wherein:

each Q', independently, is selected from R^1, OR^1, SR^1 and $N(R^1)_2$

M is Si;

Z^1 is



Z^2 is —CN or —NC;

X^2 is $—OSi(R^1{}_1)$, $—R^6$, $—OR^6$ or $—NR'R''$;

R^6 is

(a) a hydrocarbyl radical which is an aliphatic, alicyclic, aromatic or mixed aliphatic-aromatic radical containing up to 20 carbon atoms;

(b) a polymeric radical containing at least 20 carbon atoms;

(c) a radical of (a) or (b) containing one of more ether oxygen atoms within aliphatic segments thereof;

(d) a radical of (a), (b) or (c) containing one or more func-

tional substituents that are unreactive under polymerizing conditions; or

(e) a radical of (a), (b), (c) or (d) containing one or more initiating sites;

each R^1, independently, is a hydrocarbyl radical which is an aliphatic, alicyclic, aromatic or mixed aliphatic-aromatic radical containing up to 20 carbon atoms or —H, provided that at least one R^1 group is not —H;

each of R^2 and R^3 is independently selected from —H and hydrocarbyl, defined as for R^6 above, subparagraphs (a) to (e); and

each of R′ and R″ is independently selected from C_{1-4} alkyl.

4,957,974

GRAFT COPOLYMERS AND BLENDS THEREOF WITH POLYOLEFINS

Casmir S. Ilenda, Hulmeville; Newman Bortnick, Oreland, both of Pa.; Roger K. Graham, Moorestown, N.J., and William J. Work, Huntingdon Valley, Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 174,648, Mar. 29, 1988, abandoned. This application Mar. 1, 1989, Ser. No. 315,501

Int. Cl.[5] C08F *255/02, 267/02*

U.S. Cl. 525—301 **8 Claims**

1. A graft copolymer capable of imparting to a polyolefin when blended therewith a relatively high tensile modulus and high resistance to sagging without increasing melt viscosity, the copolymer comprising:

(a) a non-polar polyolefin trunk selected from the group consisting of polyethylene, polypropylene, polybutylene, poly(4-methylpentene), copolymers of said olefins with each other, and one or more copolymers of said olefins with minor amounts of 1-alkenes, vinyl esters, vinyl chloride, (meth)acrylic ester, and (meth)acrylic acid, said trunk having a Mw of between about 50,000 and 1,000,000; and

(b) at least one methacrylate chain grafted with a covalent bond to said trunk having a weight ratio with said trunk of from about 1:9 to about 4:1, said chain being a polymer derived from at least about 80% of a monomer of a methacrylic ester of the formula $CH_2=C(CH_3)COOR$, where R is alkyl, aryl, substituted alkyl, substituted aryl, or substituted alkaryl, and less than about 20% of an acrylic or styrenic monomer copolymerizable with the methacrylic ester, said chain having a Mw of from about 20,000 to 200,000.

4,957,975

FLUOROELASTOMER COMPOSITION WITH LOW TENDENCY TO FOUL MOLDS

Dana P. Carlson, Chadds Ford, Pa., and Walter W. Schmiegel, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 14, 1988, Ser. No. 167,868

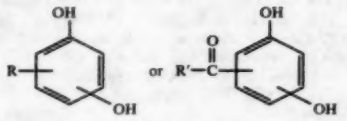
Int. Cl.[5] C08F *8/00*

U.S. Cl. 525—340 **14 Claims**

1. A fluoroelastomer composition that exhibits low tendency to foul mold cavities which comprises:

(a) a fluoroelastomer comprising vinylidene fluoride units and units of at least one other fluorine-containing monomer copolymerizable with vinylidene fluoride, said monomer containing 2–7 carbon atoms and containing at least as many fluorine atoms as carbon atoms;

(b) a crosslinking agent selected from the group consisting of a bisphenol or a polyhydroxy phenol of the formula:



wherein R is H, or an alkyl group or aryl group and R′ is an alkyl group or an aryl group,

(c) a divalent metal oxide or hydroxide as an acid acceptor;

(d) 0.2–4 parts by weight per 100 parts by weight fluoroelastomer of a crosslinking accelerator which is a quaternary ammonium salt of the formula $R''_4N^+X^-$ wherein each R″ is independently an alkyl group of 2–4 carbon atoms and X^- is selected from the group consisting of fluoride, dihydrogen phosphate, periodate, acetate, hydrogen sulfate, methane sulfonate, toluene sulfonate, or an anion of a bisphenol or a polyhydroxy phenol of (b) above.

4,957,976

PROCESS FOR PREPARING DIENE POLYMER RUBBERS

Hiroyoshi Takao, Chiba; Akio Imai, Ichihara; Tomoski Seki, Ichihara, and Mitsuji Tsuji, Ichihara, all of Japan, assignors to Sumitomo Chemical Company Limited, Osaka, Japan

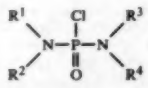
Continuation of Ser. No. 126,338, Nov. 30, 1987, abandoned. This application Sep. 29, 1989, Ser. No. 415,380

Claims priority, application Japan, Dec. 1, 1986, 61-287091; Dec. 27, 1986, 61-315210; Dec. 27, 1986, 61-315211; Jan. 28, 1987, 62-19262; Jan. 28, 1987, 62-19263; Feb. 16, 1987, 62-32782

Int. Cl.[5] C08F *8/40*

U.S. Cl. 525—340 **6 Claims**

1. A process for preparing a modified diene polymer which comprises reacting an alkali metal-containing conjugated diene polymer with a phosphoryl chloride compound of the formula (I):



(I)

wherein each of R^1, R^2, R^3 and R^4 is an alkyl group,

said alkali metal-containing conjugated diene polymer being a living polymer having an alkali metal end prepared by a polymerization of a conjugated diene monomer or a mixture of a conjugated diene monomer and an aromatic vinyl monomer in a hydrocarbon solvent in the presence of an alkali metal-based catalyst, or a polymer to which an alkali metal is introduced by an addition reaction of a diene polymer having conjugated diene units in the polymer chain and an alkali metal-based catalyst in a hydrocarbon solvent.

4,957,977

VINYLAMINE COPOLYMER, FLOCCULATING AGENT ETC.

Takaharu Itagaki, Yokohama; Mitsuaki Shiraga, Machida; Shigeru Sawayama, Yokohama, and Kohichi Satoh, Zama, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

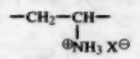
Continuation of Ser. No. 65,296, Jun. 22, 1987, abandoned. This application Jan. 25, 1990, Ser. No. 470,395

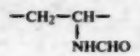
Claims priority, application Japan, Jun. 25, 1986, 61-148680

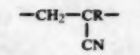
Int. Cl.[5] C08F *8/12*

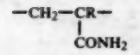
U.S. Cl. 525—328.4 **20 Claims**

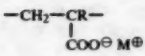
1. A vinylamine copolymer having the structural units represented by the following formulas (I), (II), (III), (IV) and (V):


[I]


[II]


[III]


[IV]


[V]

wherein $X^{\ominus}$ represents an anion, R represents a hydrogen atom or a methyl group, $M^{\oplus}$ represents a hydrogen ion or a monovalent cation, in which the molar fraction of the structural unit (I) is 5 to 85% by mole, the molar fraction of the structural unit (II) is 2 to 85% by mole, the molar fraction of the structural unit (III) is 5 to 80% by mole, the molar fraction of the structural unit (IV) is 0 to 40% by mole, all of said molar fractions being based on the vinylamine copolymer, and the molar fraction of the structural unit (V) is 0 to 8% by mole which is based on the total content of the structural units (III), (IV) and (V) and the total of the molar fractions of the structural units I–V is equal to 100%.

4,957,978

POLY(ARYL ETHER SULFONE) COMPOSITIONS HAVING IMPROVED FLOW PROPERTIES

James E. Harris, Evans, Ga., assignor to Amoco Corporation, Chicago, Ill.

PCT No. PCT/US88/02541, § 371 Date Feb. 13, 1989, § 102(e) Date Feb. 13, 1989, PCT Pub. No. WO89/01003, PCT Pub. Date Feb. 9, 1989

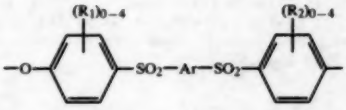
Continuation-in-part of Ser. No. 78,460, Jul. 27, 1987, Pat. No. 4,818,803. This PCT application Jul. 27, 1988, Ser. No. 344,289

The portion of the term of this patent subsequent to Apr. 4, 2006, has been disclaimed.

Int. Cl.[5] **C08G** *65/48, 65/38;* **C08C** *8/02;* **C08F** *283/00*

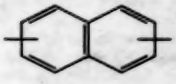
U.S. Cl. 525—390 **12 Claims**

1. A poly(aryl ether sulfone) composition having improved flow properties comprising an immiscible blend of (a) from about 80 to about 99 percent by weight of a poly(aryl ether sulfone) having a second order glass transition temperature (Tg) higher than about 240° C., which consists essentially of units of the formula:

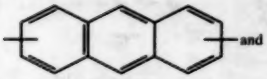


wherein Ar is selected from the group of:

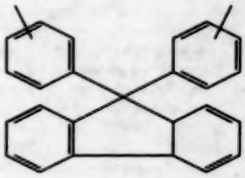
-continued



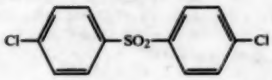
or isomers thereof



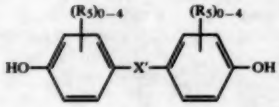
or isomers thereof



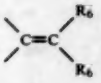
and R_1 and R_2 are C_1 to C_4 alkyl or alkoxy groups and can be the same or different, and (b) from about 1 to about 20 percent by weight of a second poly(aryl ether sulfone) having a Tg lower than about 225 C, which poly(aryl ether sulfone) is prepared by the nucleophilic polycondensation reaction of:



with bisphenols of the formula:



wherein X' is selected from the group consisting of alkylene and alkylidene radicals having up to and inclusive eight carbon atoms, cyclo-alkylene and cycloalkylidene radicals having up to and inclusive nine carbon atoms, S, CO, and the radicals:



the R_5's are hydrogen or C_1 to C_4 alkyl or alkoxy radicals or halogen atoms and can be the same or different; the R_6's are hydrogen or C_1 to C_4 alkyl radicals or halogen atoms and can be the same or different.

4,957,979

METHOD OF MAKING AND USING THERMOPLASTIC BLOCK COPOLYMERS

Italo Albini, Pavia, Italy; Werner Gruber, Korschenbroich, Fed. Rep. of Germany; Norbert Wiemers, Monheim, Fed. Rep. of Germany; Juergen Wichelhaus, Wuppertal, Fed. Rep. of Germany; Roberto Leoni, Mailand, Italy, and Angela Rossini, Mailand, Italy, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf-Holthausen, Fed. Rep. of Germany

Continuation of Ser. No. 102,280, Sep. 28, 1987, abandoned, which is a continuation of Ser. No. 829,377, Feb. 13, 1986, abandoned. This application Dec. 5, 1988, Ser. No. 281,861

Claims priority, application Fed. Rep. of Germany, Feb. 13, 1985, 3504805

Int. Cl.[5] C08G 69/48

U.S. Cl. 525—420.5 11 Claims

1. A method of making a thermoplastic poly(amide-urethane) block copolymer having excellent flexibility at low temperatures and excellent adhesion properties, comprising reacting:

(a) a substantially linear polyamide having terminal groups selected from the group consisting of carboxyl and amino groups, the polyamide being obtained by reacting a dimerized fatty acid and an aliphatic or a cycloaliphatic diamine; and

(b) one or more prepolymers selected from the group consisting of substantially linear, isocyanate-terminated aliphatic polyethers and reaction products of said aliphatic polyethers with 2,3-epoxy propanol;

to form a block copolymer product containing substantially no free isocyanate groups or epoxide groups.

4,957,980

POLYESTER RESIN COMPOSITION AND HOLLOW MOLDED ARTICLE THEREOF

Shigeo Kobayashi; Toshio Hiramatsu; Katsumasa Yamamoto, and Nobuhiko Ichikawa, all of Ohtsu, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed Aug. 8, 1988, Ser. No. 229,463

Int. Cl.[5] C08L 77/00

U.S. Cl. 525—425 1 Claim

1. A polyester resin composition which comprises 100 parts by weight of a thermoplastic polyester resin (A), 1 to 100 parts by weight of a polyamide resin having metaxylylene group (B) and 0.01 to 50 parts by weight of a compatibilizing agent (C), wherein the compatibilizing agent (C) is a modified copolyester resin obtained by grafting maleic anhydride to a copolyester of terephthalic acid, ethylene glycol and cyclohexane dimethanol.

4,957,981

INTERPENETRATING POLYMER NETWORK OF AN ALIPHATIC POLYOL(ALLYL CARBONATE) AND EPOXY RESIN

Jan André J. Schutyser, Dieren, and Tjerk O. Boonstra, Arnhem, both of Netherlands, assignors to Akzo N.V., Netherlands

Filed Feb. 1, 1990, Ser. No. 473,488

Claims priority, application Netherlands, Feb. 10, 1989, 8900323

Int. Cl.[5] C08L 47/00

U.S. Cl. 525—529 2 Claims

1. A polymeric material based on an aliphatic polyol(allyl carbonate), the polymeric material comprised of an interpenetrating polymer network of a polymerizate of the aliphatic polyol(allyl carbonate) and an aliphatic or cycloaliphatic epoxy resin.

4,957,982

PROCESS FOR REDUCING REACTOR FOULING DURING POLYMERIZATION IN AN AQUEOUS MEDIUM

Kenneth R. Geddes, Clitheroe, England, assignor to Crown Decorative Products Limited, Derby, England

Filed Jul. 6, 1988, Ser. No. 215,765

Claims priority, application United Kingdom, Jul. 10, 1987, 8716377

Int. Cl.[5] C08F 2/16, 2/22

U.S. Cl. 526—62 4 Claims

1. A process for the production of emulsion, dispersion, latex or bead polymers in a water medium in a polymerization reactor wherein the reactor exposed surfaces are coated with a film of oleophobic-hydrophobic polymeric material of surface energy in the range of about 10–15 dynes/cm which is insoluble in, undamaged by, unreactive with and unwetted by the raw materials or reaction products of the process.

4,957,983

METHOD FOR PROVIDING IMPROVED COLLOIDAL STABILITY AND POLYVINYL CHLORIDE USING A HOT CHARGE POLYMERIZATION PROCEDURE WITH EMULSIFIER PACKAGE

Roman B. Hawrylko, Avon Lake, Ohio, and Richard A. Widdifield, Niagara Falls, Canada, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Jun. 7, 1989, Ser. No. 362,627

Int. Cl.[5] C08F 2/20

U.S. Cl. 526—200 9 Claims

1. A polymerization method comprising the steps of

(a) forming a mixture of vinyl chloride monomer and optional vinyl chloride comonomer and water in a reaction vessel, and bringing said mixture to a reaction temperature of more than about 40° C.;

(b) allowing an initial period of from 0 to 15 minutes to elapse;

(c) adding an emulsifier package to said reaction vessel, said emulsifier package comprising a partially saponified polyvinyl alcohol emulsifier having a degree of saponification of from about 60 to about 90 mole percent and a methanol index at 55° C. of up to about 60 percent and a secondary emulsifier comprising a substituted cellulosic dispersant;

(d) allowing a second period of from 0 to 15 minutes to elapse; and

(e) adding an effective amount of a catalyst to cause said polymerization to begin.

4,957,984

PROCESS FOR PRODUCING HIGHLY WATER ABSORPTIVE POLYMER

Kiichi Itoh; Takeshi Shibano; Shuhei Yada, and Shinji Tsunoi, all of Yokkaichi, Japan, assignors to Mitsubishi Petrochemical Company Limited, Tokyo, Japan

Filed Jun. 16, 1989, Ser. No. 367,312

Claims priority, application Japan, Jun. 16, 1988, 63-149151; Jul. 22, 1988, 63-183365

Int. Cl.[5] C08F 30/04

U.S. Cl. 526—240 6 Claims

1. A process for producing a highly water absorptive polymer, which comprises subjecting an aqueous solution of partially neutralized sodium acrylate wherein 20 to 45% of the carboxyl group has been neutralized to its sodium salt, the concentration of said partially neutralized sodium acrylate in the aqueous solution being 55 to 80% by weight, to solution polymerization in the presence of a crosslinking agent and 0–20 mol % based on said partially neutralized sodium acrylate of at least one basic vinyl monomer selected from the group consisting of (meth)acrylamide, N,N-dimethyl(meth)acrylamide, dimethylaminoethyl(meth)acrylamide, 2-vinylpyridine, and 4-vinylpyridine with the use of a water soluble radical polymerization initiator.

4,957,985

FLUORINE-SUBSTITUTED HYDROCARBON GROUP GRAFTED (METH)ACRYLATE POLYMERS

Tokinori Agou, Ohno; Takeshi Sakashita, Iwakuni; Tomoaki Shimoda, Waki; Masaru Sudo, Ohtake; Masahiro Kuwabara, Waki, and Masahide Tanaka, Iwakuni, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

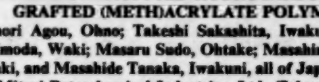
Filed Dec. 29, 1987, Ser. No. 138,653

Claims priority, application Japan, May 18, 1987, 62-118956; Dec. 29, 1987, 61-312934

Int. Cl.[5] C08F *265/04, 120/28, 220/28*

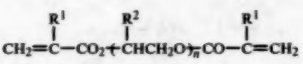
U.S. Cl. 526—246 12 Claims

1. A fluorine-containing, hydrophilic, oxygen permeable, gelled, crosslinked polymer having water swellability comprising as an essential monomer component a fluorine-containing (meth)acrylate monomer composed of a (meth)acrylate ester monomer represented by the following general formula (I)



(I)

or the following general formula (II)



(II)

wherein R^1, R^2 and R^3 each represent a hydrogen atom or a methyl group, R^4 represents a hydrocarbon group having 1 to 30 carbon atoms or a hydrocarbon group having 1 to 30 carbon atoms which contains not more than 61 oxygen or fluorine atoms, and m and n each represent an integer of 1 to 1,000, and graft-bonded to the alkylene group in the main chain of the (meth)acrylate monomer, at least one fluorine-substituted hydrocarbon group having 1 to 30 carbon atoms and at least three fluorine atoms, per molecule of the (meth)acrylate monomer.

4,957,986

PARTIALLY FLUORINATED POLYESTERS FROM KETENE ACETALS AND FLUORINE MONOMERS

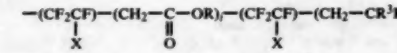
Harry N. Cripps, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 227,139, Aug. 2, 1988. This application Dec. 15, 1989, Ser. No. 451,002

Int. Cl.[5] C08F *14/22, 14/26, 14/28*

U.S. Cl. 526—247 7 Claims

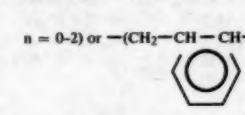
1. A partially fluorinated polyester terpolymer of the formula:



wherein

X = F, CF_3, Cl, Br, I, OCF_3, OCF_2CF_3, $OCF_2CF_2CF_3$, or $OCF_2CF(CF_3)O(CF_2)_2CF_3$;

R = ≦$(CHR^1(CH_2)_nCHR^2)$—(where



n = 0-2) or —$(CH_2$—CH — CH—$CH_2)$—

R^1 and R^2 are independently H, C_1–C_4 alkyl or phenyl

R^3 = H, C_1–C_4 alkyl

R^4 = H, C_1–C_4 alkyl, C_1–C_4 alkoxy

0.1 ≦ i ≦ 1.9 and i + J = 2.

4,957,987

ACRYLATE RESINS AS BINDERS FOR COLOR CONCENTRATES

Manfred Krieg, Darmstadt; Hans Lichtenstein, Babenhausen; Ludwig Hosch, Michelstadt, and Guenther Ittmann, Gross-Umstadt, all of Fed. Rep. of Germany, assignors to Röhym GmbH, Darmstadt, Fed. Rep. of Germany

Division of Ser. No. 004,239, Jan. 2, 1987, Pat. No. 4,773,913, which is a continuation of Ser. No. 821,866, Jan. 22, 1986, abandoned, which is a continuation of Ser. No. 623,026, Jun. 21, 1989, abandoned. This application Apr. 25, 1988, Ser. No. 185,446

Claims priority, application Fed. Rep. of Germany, Jul. 2, 1983, 3323951

Int. Cl.[5] C09B *67/00;* C08F *26/00*

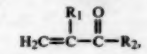
U.S. Cl. 526—258 7 Claims

1. A color concentrate, suitable for dispersion in a synthetic resin for coloring the same, said concentrate consisting essentially of a colorant dispersed in a polymeric binder consisting essentially of

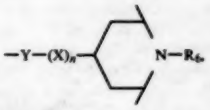
(a) 70–90 percent, by weight of the polymer, of methyl ethacrylate,

(b) 10–20 percent, by weight of the polymer, of methyl acrylate, and

(c) 0.1–10 percent, by weight of the polymer, of a free radically polymerizable monomer of the formula



wherein R_1 is hydrogen or methyl and R_2 is



wherein Y is oxygen or —NR_5, X is linear or branched alkylene having 2 to 10 carbon atoms or is cycloalkyl and R_5 is hydrogen or alkyl having 1 to 6 carbon atoms, n is 0 or 1, and R_6 is hydrogen or alkyl having 1 to 6 carbon atoms.

4,957,988

PROCESS AND POLYMERS FOR THE PRODUCTION OF IMAGES

Edward Irving, Cambridge, England; Beat Müller, Marly, Switzerland; Adrian Schulthess, Villars-sur-Glane, Switzerland, and Max Hunziker, Bösingen, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

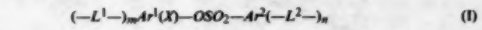
Continuation of Ser. No. 865,495, May 20, 1986, abandoned. This application Mar. 28, 1988, Ser. No. 178,810

Claims priority, application United Kingdom, May 22, 1985, 8512998

Int. Cl.[5] C08F *226/06, 228/02*

U.S. Cl. 526—259 15 Claims

1. An acrylic polymer having an average molecular weight of at least 500 which is insoluble in base but which becomes soluble in base on exposure to actinic radiation and which contains at least one residue of formula I

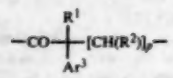


(I)

wherein

one of m and n denotes 1 and the other denotes 0 or 1,

X denotes either a group of formula II



(II)

linked through the carbonyl group to an aromatic carbon atom in Ar^1, or a group of formula III

(III)

linked through the carbonyl groups to aromatic carbon atoms in Arhu 1,

p denotes 0 or 1,

when p denotes 0, R^1 is a hydrogen atom; C_1–C_8alkyl which is unsubstituted or substituted by —OH, —Cl, —CN, C_1–C_4alkoxy, C_2–C_5alkoxycarbonyl, phenyl, chlorophenyl, C_7–C_{10}alkylphenyl or C_7–C_{10}alkoxyphenyl; phenyl which is unsubstituted or substituted by —Cl, C_1–C_4alkyl, C_1–C_4alkoxy or C_1–C_4alkylthio; benzoyl; C_2–C_8alkoxycarbonyl; C_1–C_4alkyl—NHCO—; phenyl—NHCO; —$CONH_2$; or —CN;

when p denotes 1, R^1 is a hydrogen atom, a hydroxyl group, C_1–C_4alkoxy, acetyloxy or a C_1–C_8alkyl group which is unsubstituted or substituted by phenol;

R^2 denotes a hydrogen atom; C_1–C_8alkyl which is unsubstituted or substituted by —OH, Cl or phenyl; phenyl which is unsubstituted or substituted by —OH, —Cl, C_1–C_4alkyl or C_1–C_4alkoxy; C_2–C_6alkenyl; C_8–C_9phenylalkenyl; furyl; C_5–C_6cycloalkyl; or C_5–C_6cycloalkenyl;

when X denotes a group of formula II, Ar^1 and Ar^2 each represent a phenyl, naphthyl, phenylene or naphthylene group which is unsubstituted or substituted by —Cl, —Br, —CN, —NO_2, C_1–C_{12}alkyl, C_1–C_4alkoxy or C_1–C_8alkylthio, at least one of Ar^1 and Ar^2 being an unsubstituted or substituted phenylene or naphthylene group;

when X denotes a group of formula III, Ar^1 denotes an o-phenylene, 1,2-, 2,3- or 1,8-naphthylene benzene 1,2,3-, 1,2,5-, 1,2,4- or 1,2,6-triyl group, unsubstituted or substituted by —Cl, —Br, —NO_2, C_1–C_8alkyl, C_1–C_4alkoxy, C_1–C_{12}alkylthio or phenylthio; and Ar^2 denotes phenyl, m- or p-phenylene, naphthyl, or 1,2-, 2,3- or 1,8-naphthylene group, which is unsubstituted or substituted by —Cl, —Br, —NO_2, C_1–C_{15}alkyl, C_1–C_4alkoxy, C_1–C_4alkyl—CONH, or phenylCONH—;

Ar^3 denotes a phenyl group which is unsubstituted or substituted by —Cl, C_1–C_4alkyl, C_1–C_4alkoxy or C_1–C_4alkylthio; and

L^1 L^2 each denote —CO—, —COO—, —CONH—, —OCOO—, —NHCONH—, —OCONH—, —CSS—, —OCSS—, —OSO_2—, —CH_2—, —CH=, —O—, —S— or —N=.

4,957,989

VEHICLE FOR SLOW DISSOLVING COATING MATERIAL

Nobuhiro Saitoh, Gunma, Japan, assignor to Toshiba Silicone Co., Ltd., Tokyo, Japan

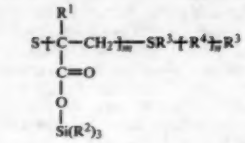
Filed Jan. 26, 1990, Ser. No. 470,669

Claims priority, application Japan, Jan. 27, 1989, 1-16266

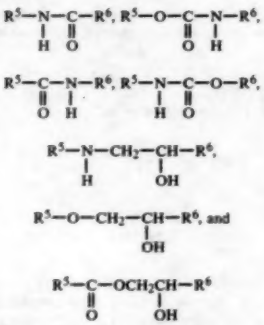
Int. Cl.[5] C08F *230/08*

U.S. Cl. 526—279 **7 Claims**

1. A vehicle for a slow dissolving coating material, comprising a triorganosilyl (meth)acrylate copolymer consisting essentially of repeating units represented by the formula



wherein R^1 represents hydrogen or methyl; R^2 represents a monovalent hydrocarbon group; R^3 is a group selected from the group consisting of



wherein R^5 represents a divalent hydrocarbon group containing an oxygen atom, an aromatic ring, or an alicyclic ring, and R^6 represents a divalent hydrocarbon group containing an oxygen atom, a sulfur atom, an aromatic ring, or an alicyclic ring; R^4 represents a divalent hydrocarbon group having 2 to 18 carbon atoms and containing an oxygen atom, an aromatic ring, or an alicyclic ring; and m and n each represents an integer of 1 or larger.

4,957,990

MATERIALS FOR OPTICAL USE

Ryoichi Sudo, Yokosuka; Makoto Kobata, Yokohama; Hiroaki Miwa, and Tetsuo Tajima, both of Fujisawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

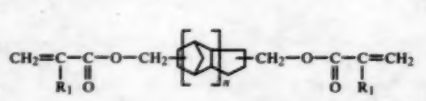
Filed Oct. 13, 1988, Ser. No. 257,832

Claims priority, application Japan, Oct. 14, 1987, 62-257221

Int. Cl.[5] C08F *36/20*

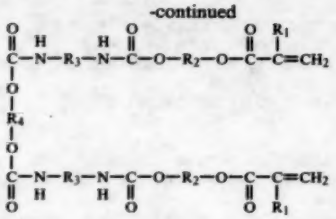
U.S. Cl. 526—282 **4 Claims**

1. A material for optical use obtained by subjecting to radical copolymerization 90 to 20% by weight of a (meth)acrylate compound represented by the following formula (I) and 10 to 80% by weight of a (meth)acrylate compound represented by the following formula (II):



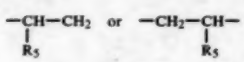
(I)

-continued

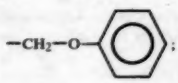


(II)

wherein n is 1 to 6; R_1 is —H or —CH_3; R_2 is



in which R_5 is —H, an alkyl group having 1 to 5 carbon atoms or



R_3 is a hydrocarbon group having 6 to 16 carbon atoms; and R_4 is a hydrogen group having 2 to 300 carbon atoms.

4,957,991

CHLOROPRENE POLYETHER (METH)ACRYLATE COPOLYMER AND PROCESS FOR PRODUCING SAME

Nobuhiro Hirashima; Shiro Matsunaga, and Mitsuyuki Nakata, all of Niigata, Japan, assignors to Denki Kagaku Kogyo KK, Tokyo, Japan

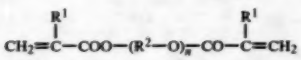
Continuation of Ser. No. 709,101, Mar. 7, 1985, abandoned. This application Dec. 1, 1986, Ser. No. 936,382

Claims priority, application Japan, Mar. 13, 1984, 59-47935

Int. Cl.[5] C08F *236/18*

U.S. Cl. 526—295 **2 Claims**

1. A chloroprene copolymer prepared by free-radical copolymerization of 50 to 95% by weight of chloroprene, 5 to 50% by weight of a polyether dimethacrylate represented by the following formula, and 0 to 10% by weight of a monomer copolymerizable with chloroprene, these percentages being based on the total amount of the monomers:



wherein: R^1 represents a hydrogen atom or methyl group; n is an integer of 5 to 20; and R^2 represents a straight or branched chain alkylene group having an average number of carbon atoms of 3 to 6, a plurality of R^2s being the same or different.

4,957,992

HAIR COSMETIC COMPOSITION

Takeshi Inoue, Utsunomiya; Tadasu Hikichi, Yachiyo; Yukihiro Fukuyama, Wakayama, and Akihiro Kondo, Wakayama, all of Japan, assignors to Kao Corporation, Tokyo, Japan

Filed Apr. 13, 1988, Ser. No. 181,173

Claims priority, application Japan, Apr. 21, 1987, 62-98234

Int. Cl.[5] C08F *222/10*

U.S. Cl. 526—324 **5 Claims**

1. A hair cosmetic composition comprising fine particles of a crosslinked polymer which is derived from a monofunctional oil-soluble monomer having one ethylenically unsaturated bond, said polymer of a monofunctional oil-soluble monomer having one ethylenically unsaturated bond having a glass transition point of not higher than 300° K., said crosslinked polymer being insoluble in water and ethanol, and not forming a film at normal temperature, wherein said fine particles of a crosslinked polymer having an adhesion of 8–100 g.f/cm and modulus of elasticity of 5×10^5–30×10^5 dyn/cm^2.

4,957,993

NOVEL POLYIMIDESILOXANES AND METHODS FOR THEIR PREPARATION AND USE

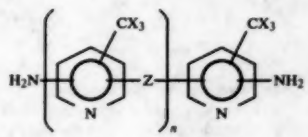
Chung J. Lee, E. Amherst, N.Y., assignor to Occidental Chemical Corporation, Niagara Falls, N.Y.

Filed Nov. 14, 1988, Ser. No. 270,920

Int. Cl.[5] B05D *3/02*; C08F *2/46*; C08G *77/04*

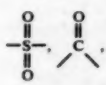
U.S. Cl. 528—26 **57 Claims**

1. In a substantially fully imidized polyimidesiloxane comprising the reaction product of an organic dianhydride, a difunctional siloxane monomer, and an organic amine, the improvement wherein the organic amine has the formula



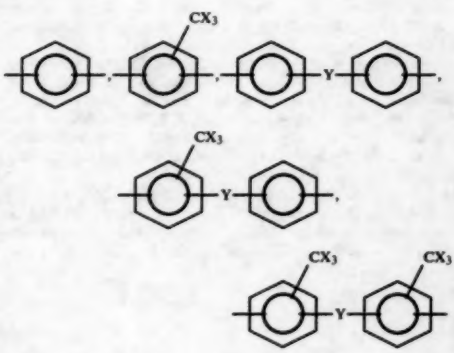
wherein X is hydrogen, halide, phenyl or combinations thereof,

Z=—O—, —S—,

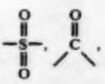


>$C(CX_3)_2$, —, or —Y—Ar—Y—

Ar=



Y=—O—, —S—,



>$C(CX_3)_2$, or —; and n=0 or 1.

4,957,994

EPOXY RESINS CONTAINING IMIDO RINGS, PRODUCTION PROCESS THEREOF AND EPOXY RESIN COMPOSITIONS CONTAINING THE SAME

Tatsuhiro Urakami; Yoshimitsu Tanabe, both of Yokohama; Keizaburo Yamaguchi, Chiba, and Akihiro Yamaguchi, Kamakura, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

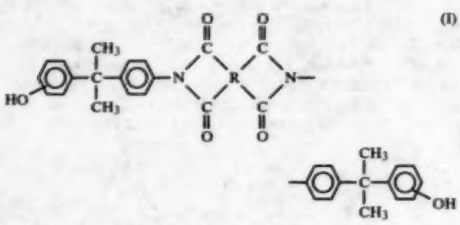
Filed Aug. 15, 1989, Ser. No. 393,798

Claims priority, application Japan, Aug. 19, 1988, 63-204789

Int. Cl.[5] C08G *59/26*

U.S. Cl. 528—90 **15 Claims**

1. An epoxy resin obtained from an imido-ring-containing diphenol represented by the following formula (I):



(I)

wherein R represents an aliphatic group having at least two carbon atoms, an alicyclic group, a monocyclic aryl group, a fused polycyclic aromatic group, or a non-fused polycyclic aromatic group formed of aromatic groups coupled together directly or via a linking member and the two hydroxyl groups are each bonded to a meta position or the para position, at least 50% of the hydroxyl groups of molecules of said diphenol having been epoxidized.

4,957,995

LOW-VISCOSITY EPOXY RESIN, AND FIBER-REINFORCED COMPOSITE MATERIAL BASED ON M-ALKYL TRIGLYCIDYLAMINOPHENOLS

Yasuhisa Saito, Higashiosaka; Katsuya Watanabe, Takatsuki; Kohichi Okuno, Izumiotsu; Kunimasa Kamio, Suita, and Akira Morii, Ibaraki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

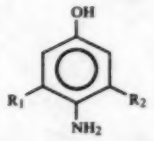
Division of Ser. No. 174,703, Mar. 29, 1988, Pat. No. 4,900,848, which is a continuation-in-part of Ser. No. 96,210, Sep. 8, 1987, abandoned, which is a continuation of Ser. No. 909,582, Sep. 22, 1986, abandoned. This application Sep. 5, 1989, Ser. No. 402,663

Claims priority, application Japan, Sep. 27, 1985, 60-216044; Jan. 10, 1986, 61-3860; Feb. 7, 1986, 61-26601; Feb. 7, 1986, 61-26602; Feb. 7, 1986, 61-26603

Int. Cl.[5] C08G *59/10, 59/32*

U.S. Cl. 528—99 **26 Claims**

1. A method for producing an epoxy resin composition which comprises reacting an aminophenol represented by the general formula



wherein R_1 represents a hydrogen atom or an alkyl group of 1 to 4 carbon atoms, and R_2 represents an alkyl group of 1 to 4 carbon atoms, with an epihalohydrin to form an epoxy resin and mixing the epoxy resin with a curing agent.

4,957,996

PREPARATION OF POLYARYLATE OF IMPROVED COLOR WITH COBALT SALT

Ronald R. Lamonte, Flanders, N.J., assignor to Hoechst Celanese Corporation, Somerville, N.J.

Filed Oct. 12, 1988, Ser. No. 256,408

Int. Cl.[5] C08G *63/32*

U.S. Cl. 528—181 **21 Claims**

1. In a method of preparing an aromatic polyester from a molten reaction mixture of monomers comprising an aromatic dicarboxylic acid diester and a bisphenol, and wherein a polymerization catalyst is added to the reaction mixture, the improvement which comprises: improving the color of the formed aromatic polyester by adding to said molten monomeric reaction mixture a cobalt salt comprising a cobalt ester of an aliphatic or iso-aliphatic carboxylic acid which contains 3 to 20 carbon atoms.

4,957,997

PROCESS FOR CONVERTING POLYKETONES CONTAINING PENDANT FUNCTIONAL GROUPS TO POLYESTERS

Biau-Hung Chang, West Chester, and Jack Kwiatek, Cincinnati, both of Ohio, assignors to Quantum Chemical Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 416,903, Oct. 4, 1989, Pat. No. 4,929,711. This application Feb. 16, 1990, Ser. No. 481,425

Int. Cl.[5] C08G *2/00*

U.S. Cl. 528—220 **16 Claims**

1. A process for converting polyketones having pendant functionality to polyesters comprising contacting a polyketone having to a molecular weight greater than 1,000 and containing 0.01 to 50 mole percent carbonyl group and wherein the pendant functional groups contain one or more oxygen, nitrogen, sulfur or halogen atoms or a combination of said atoms with an organic peroxyacid oxidizing agent having from 2 to 30 carbon atoms in an inert liquid medium at a temperature from −20° C. to 150° C.; the molar ratio of said oxidizing agent to carbonyl ranging from 0.1:1 to 30:1 and the weight ratio of said inert liquid medium to said polyketone ranging from 1:1 to 100:1.

4,957,998

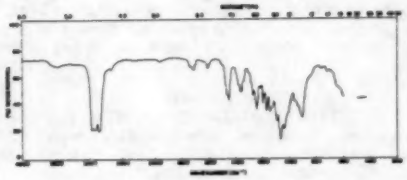
POLYMERS CONTAINING ACETAL, CARBOXY-ACETAL, ORTHO ESTER AND CARBOXYORTHO ESTER LINKAGES

Jorge Heller, Woodside; Steve Y. W. Ng, San Francisco, and Donald W. H. Penhale, Menlo Park, all of Calif., assignors to Pharmaceutical Delivery Systems, Inc., Menlo Park, Calif.

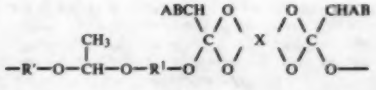
Filed Aug. 22, 1988, Ser. No. 234,806

Int. Cl.[5] C08G *63/06, 67/00*

U.S. Cl. 528—220 **39 Claims**



1. A linear or crosslinked biodegradable polymer containing a combination of the following mer units:



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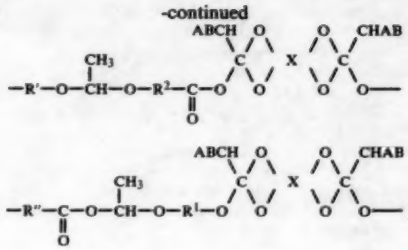
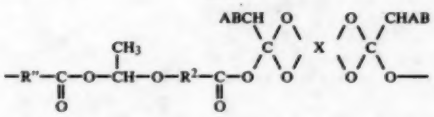


and



wherein X is a quadrivalent organic grouping, A and B may be the same or different and are selected from the group consisting of hydrogen, and lower alkyl, and R^1, R^2, R', R'' and R''' may be the same or different and are selected from the group consisting of hydrocarbyl of 1 to 14 carbon atoms, oxyhydrocarbyl of 1 to 14 carbon atoms containing 1 to 4 oxy groups, and aryl of 1 to 4 rings, and wherein said R^1, R^2, R', R'' and R''' are unsubstitent or substituted with one or more longer alkyl, amino, nitro or halogen moieties.

4,957,999

PROCESS FOR CURING AMINOPLAST RESINS

Benito See, Belle Mead, and Ulrich A. Steiner, North Plainfield, both of N.J., assignors to Amoco Corporation, Chicago, Ill.

Filed May 22, 1989, Ser. No. 354,827

Int. Cl.[5] C08G *63/00, 67/00, 69/00*

U.S. Cl. 528—271 **18 Claims**

1. A process for preparing a polyarylate having a reduced viscosity of from about 0.5 to greater than 1.0 dl/gm as measured at 25° C. in a concentration of 0.50 gm polymer per 100 ml of chloroform which process comprises the following steps:

(a) reacting an acid anhydride derived from an aliphatic monocarboxylic acid containing from 2 to 8 carbon atoms with at least one dihydric phenol to form the corresponding diester;

(b) after forming the diester, removing by vacuum distillation the bulk of the residual acid anhydride, then adding acetic acid, then vacuum distilling to bring the anhydride concentration to a level low enough to enable the formation of a polymer having a low color and good thermal stability; and

(c) reacting said diester with at least one aromatic dicarboxylic acid at a temperature sufficient to form the polyarylate.

4,958,001

DICYCLOHEXYL-3,4,3',4'-TETRACARBOXYLIC ACID OR DIANHYDRIDE THEREOF AND POLYAMIDE-ACID AND POLYIMIDE OBTAINED THEREFROM

Tohru Kikuchi; Toshiyuki Fujita; Takayuki Saito; Mitsumasa Kojima; Hidetaka Sato, and Hiroshi Suzaki, all of Hitachi, Japan, assignors to Hitachi Chemical Company, Ltd., Tokyo, Japan

Filed Oct. 3, 1988, Ser. No. 252,608

Claims priority, application Japan, Oct. 8, 1987, 62-254049; Dec. 17, 1987, 62-319206; May 10, 1988, 63-112967

Int. Cl.[5] C08G *69/26*

U.S. Cl. 528—346 **11 Claims**

1. Dicyclohexyl-3,4,3',4'-tetracarboxylic acid.

4,958,002

HIGH PURITY CRYSTALS OF BIPHENYLTETRACARBOXYLIC DIANHYDRIDE AND PROCESS FOR THEIR PREPARATION

Katsuo Imatani; Shinichirou Yamamoto, and Genji Koga, all of Ube, Japan, assignors to Ube Industries, Ltd., Ube, Japan

Filed Jun. 27, 1988, Ser. No. 211,815

Claims priority, application Japan, Jun. 25, 1987, 62-159246

Int. Cl.[5] C08G *69/26;* C07D *307/77*

U.S. Cl. 528—353 **13 Claims**

1. Crystals of a biphenyltetracarboxylic dianhydride produced by dehydration of a biphenyltetracarboxylic acid, which contains a biphenyltricarboxylic acid or its anhydride in an amount of not more than 0.2 wt.%.

4,958,003

AROMATIC SULFIDEAMIDE POLYMER AND METHOD FOR PRODUCING THE SAME

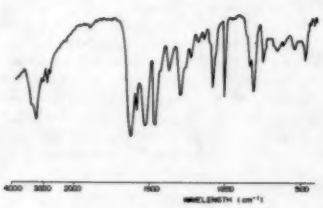
Satoshi Tomagou; Toshikazu Kato; Hiroshi Inoue, and Kensuke Ogawara, all of Mie, Japan, assignors to Tosoh Corporation, Yamaguchi, Japan

Filed Dec. 23, 1988, Ser. No. 288,881

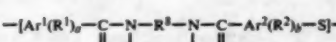
Claims priority, application Japan, Dec. 25, 1987, 62-327385

Int. Cl.[5] C08G *69/42*

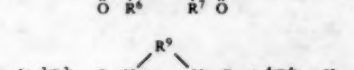
U.S. Cl. 528—364 **5 Claims**



1. An aromatic sulfideamide polymer which comprises from 1 to 99 mol % of repeating units represented by the following formula (I) and/or (II):

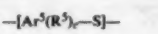


(I)



(II)

and from 99 to 1 mol % of repeating units represented by the formula (III):



(III)

wherein Ar^1, Ar^2, Ar^3, Ar^4 and Ar^5, which may be the same or different, each represent an aromatic ring; R^1, R^2, R^3, R^4, R^5, R^6 and R^7, which may be the same or different, each represent an alkyl group having 1 to 20 carbon atoms, a cycloalkyl group having 3 to 20 carbon atoms, an aryl group having 6 to 20 carbon atoms, an alkoxy group having 1 to 20 carbon atoms, an acyl group having 2 to 20 carbon atoms or an arylalkyl group having 7 to 20 carbon atoms, each of R^6 and R^7 optionally being hydrogen; a, b, c, d and e, which may be the same or different, each represent an integer of from 0 to 4; and R^8, R^9 and R^{10}, which may be the same or different, each represent an alkylene group having 1 to 20 carbon atoms, said polymer having a logarithmic viscosity [η] of 0.02 to 2.00, as determined by measuring the relative viscosity of polymer dissolved in a concentrated sulfuric acid solvent at 30° C. and at a polymer concentration of 0.5 g/100 ml or the relative viscosity of polymer dissolved in α-chloronaphthalene at 210° C. and at a polymer concentration of 0.1 g/100 ml and computing the result in accordance with the equation:

$$[\eta] = \ln \frac{(\text{relative viscosity})}{(\text{polymer concentration})} .$$

4,958,004

AROMATIC SULFIDE/SULFONE POLYMER PRODUCTION

Kenneth C. Hoover; Lacey E. Scoggins, both of Bartlesville, Okla.; Wei-Tech W. Shang, Nagoya, Japan, and Afif M. Nesheiwat, Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 31, 1987, Ser. No. 80,283
Int. Cl.[5] G08G *75/14*
U.S. Cl. 528—388 **13 Claims**

1. A process for the production of an aromatic sulfide/sulfone polymer which comprises contacting a reaction mixture consisting essentially of:

(1) at least one dihaloaromatic sulfone,
(2) at least one organic amide,
(3) at least one alkali metal hydrosulfide,
(4) water, and
(5) at least one member selected from the group consisting of
(a) alkali metal carbonates and
(b) mixtures of alkali metz. carbonates with alkali metal hydroxides wherein said mixtures have at least about 0.5 mole percent alkali metal carbonate, under polymerization conditions of temperature and time sufficient to form said polymer, wherein the molar ratio of said organic amide to said alkali metal hydrosulfide is about 4:1 to about 16:1, and wherein the molar ratio of said water to said organic amide is about 0.6:1 to about 1.2:1.

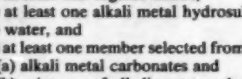
4,958,005

FLUORINE-CONTAINING COMPOSITIONS AND PROCESS FOR PREPARING THE SAME FROM CYCLIC IMINOETHERS

Takeo Saegusa; Masatoshi Miyamoto, both of Kyoto, and Yoshiyuki Sano, Shiga, all of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

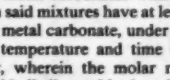
Filed Sep. 20, 1988, Ser. No. 246,748
Claims priority, application Japan, May 7, 1986, 61-105721
Int. Cl.[5] C08G *73/00*
U.S. Cl. 528—408 **11 Claims**

1. A fluorine-containing composition represented by formula (I)



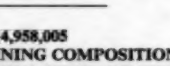
(I)

wherein X represents a group containing a polyfluoroaliphatic group having from 3 to 26 carbon atoms; R represents a hydrogen atom or an aliphatic group having from 1 to 3 carbon atoms; n represents an integer of from 2 to 3; p represents an integer of from 1 to 100; and Y represents a group represented by formula (II) or formula (III)



(II)

wherein R represents a hydrogen atom or an aliphatic group having from 1 to 3 carbon atoms; n represents an integer of from 2 to 3; and Z represents an iodine atom, a sulfonate group, or a sulfate group,



(III)

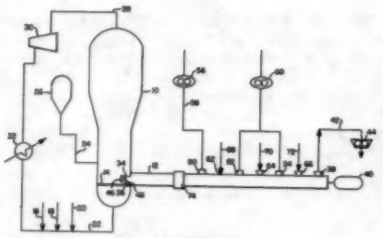
wherein R represents a hydrogen atom or an aliphatic group having from 1 to 3 carbon atoms; n represents an integer of from 2 to 3; and Z^1 represents an iodine atom, a bromine atom, a chlorine atom, or a hydroxyl group.

4,958,006

FLUIDIZED BED PRODUCT DISCHARGE PROCESS

Robert J. Bernier, Flemington; Jorge O. Bühler-Vidal, North Brunswick; Urho S. Haapala, Middlesex, and Benjamin R. Rozenblat, Old Bridge, all of N.J., assignors to Union Carbide Chemicals and Plastics Inc., Danbury, Conn.

Filed Jun. 28, 1988, Ser. No. 213,095
Int. Cl.[5] C08F *6/02*
U.S. Cl. 528—501 **12 Claims**



1. A process for the post reaction treatment of resins produced by fluidized bed polymerization of alpha olefins in a polymerization reactor which comprises:

(a) providing a screw extruder a portion of which is disposed in said reactor in communicating contact with said fluidized bed said screw extruder being adapted to receive polymer particle resins from said fluidized bed,
(b) removing polymerized product resin from said fluidized bed by the action of said screw extruder in communication with said fluidized bed,
(c) melting said resin in said extruder to form molten polymer,
(d) providing valve means for effecting a seal with said molten polymer in said extruder to provide an upstream zone from said seal into said reactor and a downstream zone from said seal in a direction away from said reactor, said seal isolating the pressure in said upstream zone from said downstream zone,
(e) devolatilizing monomer residues and volatiles dissolved in said polymer melt by venting said monomer residues and volatiles from said extruder,
(f) deactivating catalyst and cocatalyst residues by introducing a deactivating agent to said extruder,
(g) adding additives in the absence of oxygen to said ex-

truder containing said polymer melt; steps (e) through (g) being conducted in said downstream zone and

(h) discharging treated polymer product from said extruder.

4,958,007

EXTRACTION OF HUMAN INTERLEUKIN-4- FROM BACTERIA

Yair Alroy, Parsippany, and Paul Leibowitz, Hackensack, both of N.J., assignors to Schering-Plough Corp., Kenilworth, N.J.

Filed May 17, 1988, Ser. No. 194,799

Int. Cl.[5] C07K *3/12*

U.S. Cl. 530—351 **4 Claims**

1. A method of extracting insoluble interleukin-4 (IL-4) from IL-4 expressing bacterial cells comprising

(a) treating a suspension of IL-4 containing bacterial cells with an agent selected from the group consisting of toluene or an acid selected from the group consisting of phosphoric acid, hydrochloric acid, nitric acid or sulfuric acid in the presence of an enhancing agent selected from the group consisting of trichloroacetic acid or perchloric acid to deactivate the bacterial cells;

(b) disrupting the deactivated bacterial cells by mechanical means; and

(c) separating the insoluble IL-4 from the disruptate.

4,958,008

PROCESS FOR CROSSLINKING OF COLLAGEN BY INTRODUCTION OF AZIDE GROUPS AS WELL AS TISSUES AND BIOMATERIALS OBTAINED BY USE OF THE PROCESS

Hervé Petite 118 Avenue Saint-Exupéry, 69500 Bron; Philippe Menasche, 1 rue du Regard, 75006 Paris, and Alain Huc, 26 Chemin des Fonds, 69110 Sainte Foy Les Lyon, all of France

Filed Jul. 7, 1988, Ser. No. 216,407

Claims priority, application France, Jul. 8, 1987, 87 10317

Int. Cl.[5] C07K *15/20*

U.S. Cl. 530—356 **15 Claims**

1. Process of crosslinking collagen by introducing azide groups which essentially comprises the following steps:

esterification of the free acid groups of collagen,

transformation of the esterified groups into hydrazides groups,

transformation of the hydrazide groups into azide groups by the action of nitrous acid, and is characterized in that each step is separated by a rinsing in an aqueous salt solution.

4,958,009

ANTI-HUMAN OVARIAN CANCER IMMUNOTOXINS AND METHODS OF USE THEREOF

Michael J. Bjorn, Hercules, Calif.; David J. FitzGerald, Fairfax, Va.; Arthur E. Frankel, Durham, N.C.; Walter J. Laird, Pinole, Calif.; Ira H. Pastan, Potomac, Md.; David B. Ring, Redwood City, Calif.; Mark C. Willingham, Bethesda, Md., and Jeffrey L. Windelhake, Alameda, Calif., assignors to Cetus Corporation, Emeryville, Calif.

Continuation of Ser. No. 806,320, Dec. 6, 1985, abandoned. This application Jul. 6, 1987, Ser. No. 69,867

The portion of the term of this patent subsequent to Sep. 11, 2007, has been disclaimed.

Int. Cl.[5] C07K *15/12*; A61K *39/00*

U.S. Cl. 530—389 **19 Claims**

1. Immunotoxin comprising a cytotoxic moiety and a monoclonal antibody wherein said monoclonal antibody

(i) binds human ovarian cancer tissue;

(ii) has a selectivity of about 0.11 or less;

(iii) is an IgG or IgM;

said immunotoxin having at least one capability selected from the group consisting of:

a cytotoxicity ID_{50} of about 10nM or less against human ovarian cancer cells; retarding the rate of growth of tumors comprised of human ovarian cancer cells carried by a mammal when said mammal is treated with said immunotoxin; or extending the survival time of a mammal bearing a tumor comprised of human ovarian cancer cells when said mammal is treated with said immunotoxin.

4,958,010

EPIPODOPHYLLOTOXIN GLUCOSIDE LACTAM DERIVATIVES

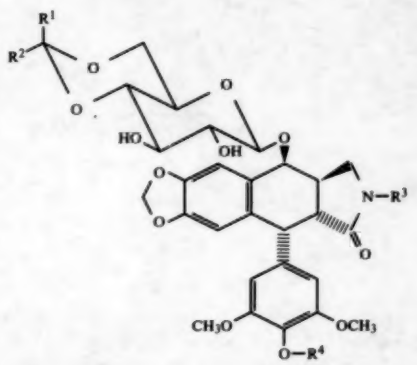
John F. Kadow, Meriden, and Dolatrai M. Vyas, Madison, both of Conn., assignors to Bristol-Myers Company, New York, N.Y.

Continuation-in-part of Ser. No. 156,253, Feb. 16, 1988, abandoned. This application Jan. 30, 1989, Ser. No. 302,010

Int. Cl.[5] C07H *15/20, 17/00*

U.S. Cl. 536—17.2 **41 Claims**

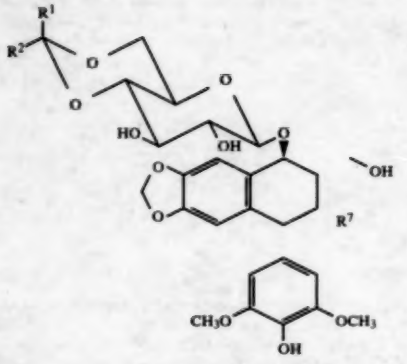
1. A compound having the formula



wherein

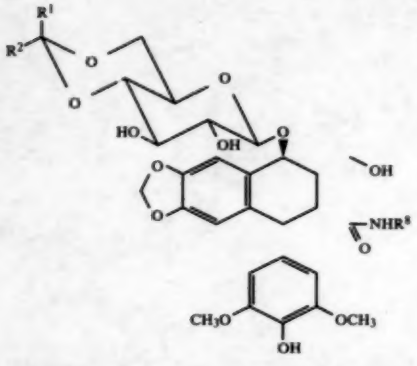
R^1 and R^2 are each C_{1-10}alkyl; or R^1, R^2, and the carbon to which they are attached represent C_{5-6}cycloalkyl; or R^1 is H and R^2 is selected from the group consisting of C_{1-10}alkyl, C_{2-10}alkenyl, C_{3-6}cycloalkyl, furyl, thienyl, C_{6-10}aryl, and C_{7-14}aralkyl; R^3 is selected from the group consisting of H, $-NH_2$, $-NH{=}CHR^5R^6$, and $-NHCHR^5R^6$; wherein R^5 and R^6 are same or different groups selected from the group consisting of H, C_{1-10}alkyl, C_{2-10}alkenyl, C_{3-6}cycloalkyl, C_{6-10}aryl, C_{7-14}aralkyl, and heteroaryl; each of the above groups is unsubstituted or substituted with one or more same or different groups selected from the group consisting of C_{1-5}alkoxy, hydroxy, amino, C_{1-5}alkylamino, di(C_{1-5}alkyl)amino, nitro, halogen, C_{1-5}haloalkyl, C_{1-5}dihaloalkyl, C_{1-5}-trihaloalkyl, cyano, C_{1-5}alkylthio, mercapto, alkanoyl, carbamoyl, carboxy, and alkanoylamino; the substituent for aryl, aralkyl, and heteroaryl groups additionally includes C_{1-5}alkyl; and R^4 is selected from the group consisting of H, alkanoyl, aroyl, aralkanoyl, and P(O)(OM-)(OM') wherein M and M' are independently selected from the group consisting of H, an alkali metal cation, and phenyl.

27. A compound having the formula



wherein R^1 and R^2 are as defined in claim 1 and R^7 is —CN or —C(O)NH_2.

32. An intermediate having the formula



wherein R^1 and R^2 are as defined in claim 1; R^8 is —NH_2 or —N=CR^5R^6 wherein R^5 and R^6 are as defined in claim 1.

4,958,011

ESTER-STABILIZED CHITIN

Maria L. Bade, Four Bowser Rd., Lexington, Mass. 02173

Continuation-in-part of Ser. No. 622,128, Jun. 19, 1984, abandoned, which is a continuation-in-part of Ser. No. 508,476, Jun. 27, 1983, abandoned. This application Jan. 17, 1986, Ser. No. 820,247

Int. Cl.[5] C08B *37/08*

U.S. Cl. 536—20 **9 Claims**

1. Ester-stabilized chitin fibers, purified from a naturally occurring calcified chitin/protein matrix, said fibers being:

(a) water insoluble;

(b) uniformly dispersible in suspension;

(c) sparsely esterfied with an ester selected from the group consisting of sulfate, nitrate, phosphate, and formate;

(d) highly elongated relative to their diameter;

(e) not subject to shear in aqueous suspension;

(f) hydrolyzed by extracellular chitinase produced by an adapted microorganism plated on agar and said ester-stabilized chitin, said hydrolysis being rapid and quantitative;

(g) substantially mineral free, yielding substantially no ash when flamed; and

(h) substantially free from protein upon hydrolysis.

4,958,012

SQUID CHITIN FORMED MATERIAL

Seiichi Tokura, Sapporo; Tsuyoshi Koriyama, Hachioji; Yoshiyuki Chiba, Hachioji, and Mikio Satake, Hachioji, all of Japan, assignors to Nippon Suisan Kaisha, Ltd., Tokyo, Japan

Filed Mar. 7, 1989, Ser. No. 319,724

Int. Cl.[5] C08B *37/00*; A61K *31/00*; D01C *3/00*

U.S. Cl. 536—20 **8 Claims**

1. A process of preparing a squid chitin sheet comprising: grinding squid chitin, suspending the ground squid chitin in water, forming a gel of said squid chitin, suspending the gel in water, submitting the suspension to filtration to eliminate water, and drying the residue.

5. A process of preparing squid chitin fiber comprising: dissolving squid chitin in formic acid, subjecting the solution to a freeze-defrost treatment to produce a dope, defoaming the dope in vacuo, and extruding the defoamed dope into a solvent to coagulate the dope.

4,958,013

CHOLESTERYL MODIFIED OLIGONUCLEOTIDES

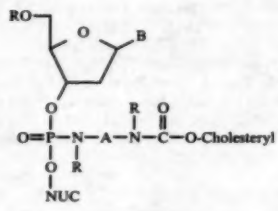
Robert L. Letsinger, Wilmette, Ill., assignor to Northwestern University, Evanston, Ill.

Filed Jun. 6, 1989, Ser. No. 362,200

Int. Cl.[5] C07H *21/00*

U.S. Cl. 536—27 **3 Claims**

1. An oligonucleotide comprising:



wherein A is selected from the group consisting of an aliphatic alkyl, branched aliphatic alkyl, and a heteroatom containing an alkyl chain of 2 to 18 carbon atoms, R is selected from the group consisting of H and lower alkyl up to 12 carbon atoms; NUC is selected from the group consisting of a phosphorothioate oligonucleotide and B is a base.

4,958,014

MULTI-CELLULAR CELLULOSE PARTICLE AND PROCESS FOR PREPARATION THEREOF

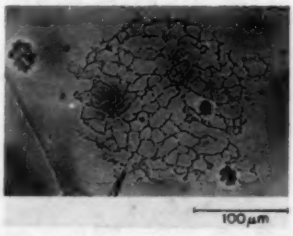
Junichi Shirokane, Nobeoka, Japan, assignor to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Aug. 9, 1988, Ser. No. 230,092

Claims priority, application Japan, Aug. 10, 1987, 62-198285

Int. Cl.[5] C08J *9/28*

U.S. Cl. 536—56 **2 Claims**



1. A multi-cellular cellulose particle comprising cells separated from one another by cell partitions in the form of mem-

branes, wherein the cells are in continuous communication with one another through openings in the partitions, and wherein least 60% by volume of the cells consist of cells having such dimensions that the largest sphere which can be fitted into each cell has a diameter of more than 2 μm.

4,958,015

PREPARATION OF CROSSLINKED CYCLODEXTRIN RESINS WITH ENHANCED POROSITY

Haya Zemel, and Mark B. Koch, both of Des Plaines, Ill., assignors to UOP, Des Plaines, Ill.

Filed Sep. 30, 1988, Ser. No. 249,131
Int. Cl.[5] C08B *37/02*
U.S. Cl. 536—103 **25 Claims**

1. A method of making a crosslinked cyclodextrin of enhanced porosity comprising reacting a solution of the cyclodextrin with from about 1 to about 20 molar proportions of a dicarboxylic acid dihalide in the presence of a blowing agent to form a solid crosslinked resin having a reduction in apparent bulk density of at least 20% relative to the crosslinked resin prepared in the absence of the blowing agent.

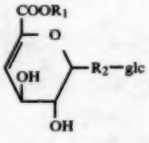
4,958,016

BIFUNCTIONAL OLIGOSACCHARIDES AND ALSO ACTIVE COMPOUNDS DERIVED THEREFROM

Antonius Kerkenaar, Blaricum; Diederik J. M. Schmedding, Driebergen, and Ronald T. M. Van Den Dool, Culemborg, all of Netherlands, assignors to Nederlandse Organisatie Voor Toegepast-Natuurwetenschappelijk Onderzoek Tno, The Hague, Netherlands

Filed Jun. 3, 1988, Ser. No. 202,788
Claims priority, application Netherlands, Jun. 9, 1987, 8701342
Int. Cl.[5] C07H *1/00*; C12N *9/88, 1/20, 1/00*
U.S. Cl. 536—123 **6 Claims**

1. Oligosaccharides,.characterized by the formula I



(I)

in which

R_1 represents a hydrogen atom, an alkyl group containing 1–4 carbon atoms or an alkali metal,

R_2 denotes a single bond or a divalent radical composed of monosaccharides, and

glc represents glucose.

4,958,017

PURIFICATION OF INOSINE FROM GUANOSINE

Shohei Fujinawa, Himeji; Yoshinori Sakamoto, Takasago, and Harumasa Iizuka, Kakogawa, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Dec. 13, 1988, Ser. No. 283,805
Claims priority, application Japan, Dec. 17, 1987, 62-320743
Int. Cl.[5] C07H *19/167, 19/16*
U.S. Cl. 536—124 **1 Claim**

1. A process for purifying inosine and producing guanosine-inosine mixture from a nucleoside mixture, which comprises:

preparing an aqueous fluid containing 10 to 30% by weight-/volume of a nucleoside mixture, said nucleoside mixture having a total amount of inosine and guanosine of more than 95% based on dry weight and a weight ratio of guanosine/inosine of 0.5 to 1,

adjusting the aqueous fluid to a pH of 9.1 to 9.5, warming the aqueous fluid to not lower than 40° C., separating solids containing said guanosine-inosine mixture from the fluid, and

crystallizing inosine from the resulting fluid.

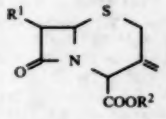
4,958,018

METHOD FOR PRODUCTION OF 3-EXOMETHYLENECEPHAM DERIVATIVES

Sigeru Torii; Hideo Tanaka, both of Okayama; Masatoshi Taniguchi, Suita; Michio Sasaoka, Tokushima; Norio Saito, Tokushima; Takashi Shiroi, Tokushima; Shigemitsu Nagao, Mobara; Ryo Kikuchi, Tokushima, and Yutaka Kameyama, Tokushima, all of Japan, assignors to Otsuka Kagaku Kabushiki Kaisha, Osaka, Japan

Filed May 4, 1989, Ser. No. 347,319
Claims priority, application Japan, May 11, 1988, 63-115711
Int. Cl.[5] C07D *501/04*
U.S. Cl. 540—215 **17 Claims**

1. A method of producing a 3-exomethylenecepham derivative of the formula



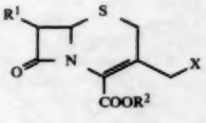
(II)

wherein

R^1 is an amino group or a substituted amino group selected from the group consisting of benzamido which may be nuclearly substituted by halogen, nitro, hydroxy or lower alkoxy, phenylglycylamido, amino-protected phenylglycylamido, p-hydroxyphenylglycylamido, amino-protected p-hydroxyphenylglycylamido, α-sulfonylphenylacetamido, α-hydroxyphenylacetamido, α-carbamoylphenylacetamido, phenylacetamido which may be nuclearly substituted by lower alkoxy, halogen or hydroxy, α-naphthylacetamido, δ-naphthylacetamido, phenoxyacetamido which may be nuclearly substituted by halogen or lower alkoxy, tetrazolylacetamido, thienylacetamido, 2-aminothiazolylacetamido, amino-protected 2-aminothiazolylacetamido, furylacetamido and protected amino

wherein the protected amino group in each of said amino-protected phenylglycylamido, amino-protected p-hydroxyphenylglycylamido, amino-protected 2-aminothiazolylacetamido and protected amino is selected from the group consisting of methylcarbamato, 9-fluorenylmethylcarbamato, 2,2,2-trichloroethylcarbamato, 2-trimethylsilylethylcarbamato, 1,1-dimethylpropylcarbamato, 1,1-dimethyl-2-cyanoethylcarbamato, tertbutylcarbamato, 1-adamantylcarbamato, benzylcarbamato, p-nitrobenzylcarbamato, diphenylmethylcarbamato, phthalimido, 2,3-diphenylmaleimido, N,phenacylamino, N-methoxymethylamino, N-2-chloroethoxymethylamino, N-benzyloxymethylamino, N-pivaloyloxymethylamino, N-benzylamino, N-o-nitrobenzylamino, N-di(p-methoxyphenyl)methylamino, N-triphenylmethylamino, N-(diphenyl-4-pyridylmethyl)amino, N-trimethylsilylamino, N-tert-butyldimethylsilylamino, benzenesulfenamido, p-methoxybenzene solfoamido and phenacylsulfonamido; and

R^2 is a carboxy-protecting group, consisting essentially of reacting a cepham derivative of the formula



(I)

wherein

R^1 and R^2 are as defined above and X is a halogen atom, with lead metal at a temperature of about −20° C. to 80° C. in an inert organic solvent capable of dissolving said cephem derivative and capable of remaining inert under the condition of said reaction or in a mixture of such organic solvent and water while maintaining the pH of the reaction system at about 0.1 to 8.

4,958,019

INTERMEDIATES FOR SYNTHESIS OF CEPHALOSPORIN COMPOUNDS

Shigeo Shimizu, and Hiroyuki Takano, both of Mukawa, Japan, assignors to Sankei Pharmaceutical Co., Ltd., Tokyo and Nippon Pharmaceutical Development Institute Company, Ltd., Hokkaido, both of, Japan

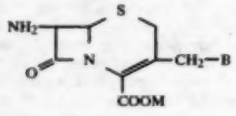
Division of Ser. No. 222,404, Jul. 21, 1988. This application May 26, 1989, Ser. No. 357,172

Claims priority, application Japan, Aug. 7, 1987, 62-196178

Int. Cl.[5] **C07D** *501/18;* **A61K** *31/545*

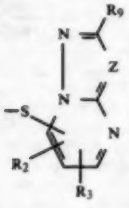
U.S. Cl. 540—226 **1 Claim**

1. A compound represented by the formula (II):



(II)

wherein M represents a hydrogen atom, a protective group or an eliminatable group which is easily hydrolyzable in a human body; B represents a group represented by the formula (b):



(b)

where at least one of R_2, R_3 and R_9 represent a group represented by the formula: —A—OR_4 where R_4 represents a hydrogen or a lower alkyl group; and A represents a straight or branched alkylene group having 1 to 6 carbon atoms; and a remaining group or groups are each independently a hydrogen atom; a cyano group; a lower alkyl group which may be substituted by a halogen atom; a carbamoyl group which may be substituted by a lower alkyl group; a cycloalkyl group; or a carboxyl group which may be substituted by a protective group or an eliminatable group which is easily hydrolyzable in a human body, and also when R_9 is —A—OR_4, R_2 and R_3 may be combined with each other to form an alkylene group having 3 to 4 carbon atoms; and Z represents a nitrogen atom or a group represented by the formula: C-R_{10} wherein R_{10} represents a hydrogen atom, a carboxyl group or a lower alkyl group which may be substituted by a hydroxy group or a lower alkoxy group.

4,958,020

PROCESS FOR PRODUCING BETA-LACTAMASE INHIBITOR

Raghavan Krishnan, Suffern; Jesse Gamble, Spring Valley, both of N.Y.; David Blum, Saddle River, N.J.; William V. Curran, Pearl River, N.Y.; Ving J. Lee, Monsey, N.Y., and Ransom B. Conrow, Pearl River, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed May 12, 1989, Ser. No. 350,966

Int. Cl.[5] **C07D** *499/00;* **A61K** *31/425*

U.S. Cl. 540—310 **1 Claim**

1. A process for producing the compound [2S-(2α,3β,5α)]-3-methyl-7-oxo-3-(1H-1,2,3-triazol-1-ylmethyl)-4-thia-1-azabicyclo[3.2.0]-heptane-2-carboxylic acid, (4-nitrophenyl)methyl ester, 4,4-dioxide, which comprises reacting a solution of azidopenamsulfone, 4-methoxyphenol and vinylpropionate with a solution of bis(trimethylsilyl)acetamide and 4-methoxyphenol in toluene at 80°–100° C. for 18–30 hours followed by filtering the resulting solution and cooling the filtrate to 0°–10° C.

4,958,021

BENZOPYRAN DERIVATIVES

Andreas Guentner; Udo Mayer, both of Frankenthal, and Andreas Oberlinner, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jul. 19, 1988, Ser. No. 221,268

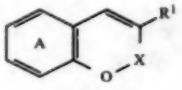
Claims priority, application Fed. Rep. of Germany, Jul. 25, 1987, 3724757

The portion of the term of this patent subsequent to Jun. 20, 2006, has been disclaimed.

Int. Cl.[5] **C07D** *311/00, 311/58, 405/04, 405/06*

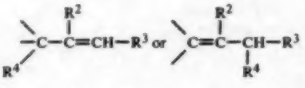
U.S. Cl. 544—129 **1 Claim**

1. A benzopyran derivative of the formula I



where

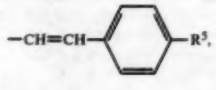
R^1 is unsubstituted C_1–C_8-alkyl, phenyl, C_1–C_4-alkoxy or halogen-substituted phenyl, C_1–C_5-alkoxy or halogen and X is the radical



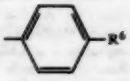
where

R^2 is hydrogen or together with R^1 is unsubstituted or C_1–C_4-alkyl-substituted C_2–C_3-alkylene,

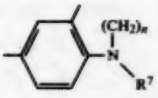
R^3 is C_1–C_4-alkoxyphenyl whose alkyl radical is substituted by phenyl, C_1–C_4-mono- or -bis(cyanoalkyl) aminophenyl, naphthyl which is substituted by C_1–C_4-mono- or -di -alkylamino, phenylamino or N-(C_1–C_4-alkyl)-N-phenylamino, 1- or 2-phenylindol-3-yl, the radical



the radical



or
the radical



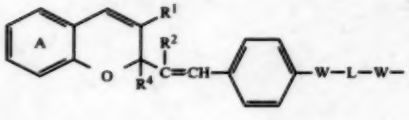
and

R^4 is hydroxyl, C_1–C_5-alkoxy, phenoxy, C_1–C_4-alkyl-, C_1–C_4-alkoxy - or halogen-substituted phenoxy, phenylsulfonyl, C_1–C_4-alkyl- or halogen-substituted phenylsulfonyl, pyrrolidino, piperidino, morpholino, 2-(pyrrolidino, piperidino or morpholino)-cyclopent-1-en-1-yl or -cyclohex-1-en-1-yl, cyclohexane-1,3-dion-2-yl which is unsubstituted or monosubstituted or disubstituted in ring position 5 by C_1–C_4-alkyl, benzoylmethyl, cyano, nitromethyl, 2,4,6-trihydroxypyrimid-5-yl, 1-phenyl-3-methylpyrazol-5-on-4-yl, 5-hydroxy-3,4-dichlorofuran-2-yloxy, or the radical

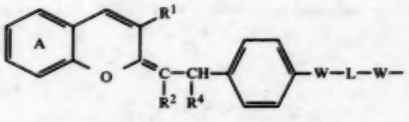
where Y and Z are identical or different and each is independently acetyl, benzoyl, C_1–C_5-alkoxycarbonyl or cyano, and if Y is cyano Z can also be methyl, and where the ring A may be fused with a benzo ring or substituted by C_1–C_4-alkyl, chlorine or bromine or, in ring position 7, by hydroxyl, C_1–C_4-alkoxy, C_1–C_5-mono- or di-alkylamino which in turn may be substituted by chlorine or phenyl, pyrrolidino, piperidino or morpholino,

R^5 being C_1–C_8-alkyl, C_1–C_8-alkoxy, which each may be substituted by phenyl, or being C_5–C_7-cycloalkyl, C_5–C_7-cycloalkoxy, C_1–C_4-mono- or di-alkylamino, phenylamino or N-(C_1–C_4-alkyl)-N-phenylamino,

R^6 being the radical



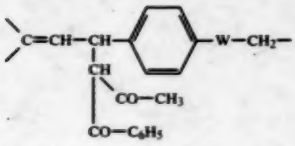
or

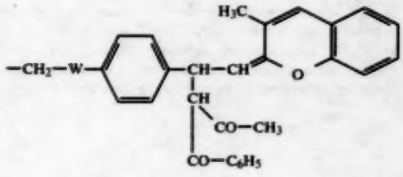


where R^1, R^2, R^4 and the ring A each have the above-mentioned meanings, W is oxygen, or C_1–C_4-alkylimino, and L is C_2–C_6-alkylene or

R^7 being C_1–C_4-alkyl and

n being 2 or 3, with the proviso that when the ring A is unsubstituted and no benzofused and R^1 is methyl and X is the radical





W is not ethylimino.

4,958,022

POLYCYCLIC COMPOUNDS

Alexander Aumueller, Deidesheim; Peter Neumann, Mannheim, and Hubert Trauth, Dudenhofen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

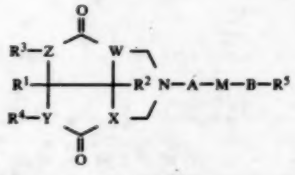
Filed Feb. 23, 1989, Ser. No. 314,146

Claims priority, application Fed. Rep. of Germany, Feb. 24, 1988, 3805758

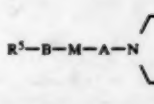
Int. Cl.[5] **C07D** *251/72, 471/18, 471/22, 487/18*

U.S. Cl. 544—180 **18 Claims**

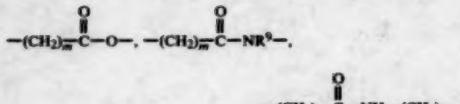
1. A polycyclic compound of the formula (I)



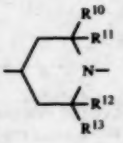
where R^1 and R^2 independently of one another are each hydrogen, C_1–C_{20}-alkyl, C_5–C_{12}-cycloalkyl, phenyl which is unsubstituted or monosubstituted or disubstituted by C_1–C_4-alkyl, C_1–C_4-alkoxy, chlorine, N,N-di-C_1–C_4-alkyl -amino, C_1–C_4-alkanoylamino or phenoxy or monosubstituted by methylenedioxy or ethylenedioxy, or pyridyl or C_7–C_{12}-phenylalkyl, or R^1 and R^2 together form a trimethylene or tetramethylene group, W and X are N and Y and Z independently of one another are each C—R^6 or nitrogen, one or more of the radicals W, X, Y or Z being C—R^6, R^6 is hydrogen, —CO_2R^7, —$CONR^7R^8$, cyano or hydroxymethyl and R^7 and R^8 are each hydrogen, C_1–C_{20}-alkyl, or phenyl which is unsubstituted or monosubstituted or disubstituted by C_1–C_4-alkyl, C_1–C_4-alkoxy, chlorine, N,N-di-C_1–C_4-alkylamino, C_1–C_4-alkanoylamino or phenoxy or monosubstituted by methylenedioxy or ethylenedioxy, or C_5–C_{12}-cycloalkyl, 2,2,6,6-tetramethylpiperidin -4-yl or C_7–C_{12}-phenylalkyl, R^3 and R^4 are each hydrogen or R^3 and R^4 together form a group of the formula



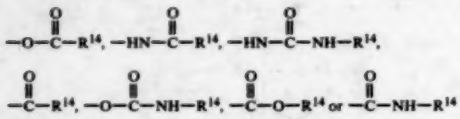
A is a chemical bond, C_1–C_{20}-alkylene,



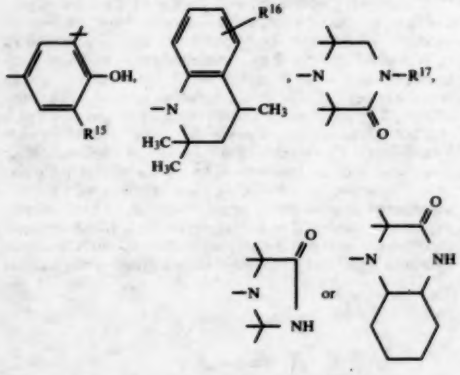
or cycloalkylene, m and o are each from 1 to 20, R^9 is C_1–C_2-alkyl, C_5C_{12}-cycloalkyl, C_7–C_{12}-phenylalkyl, phenyl which is unsubstituted or monosubstituted or disubstituted by C_1–C_4-aikyl, C_1–C_4-alkoxy, chlorine, N,N-diC_1–C_4-alkylamino, C_1–C_4-alkanoylamino or phenoxy or monosubstituted by methylenedioxy or ethylenedioxy, M is a group of the formula



and can be bonded to A both with the nitrogen atom and with the carbon atom, and R^{10}, R^{11}, R^{12} and R^{13} independently of one another are each C_1–C_4-alkyl, or R^{10} and R^{11} or R^{12} and R^{13} together form a tetramethylene or pentamethylene group, B is a chemical bond, C_1–C_{20}-alkylene or C_7–C_{18}-phenylalkylene or is C_2–C_{20}-alkylene which is interrupted by carbonyl, carboxamide or a carboxylic ester group, R^5 is hydrogen, cyano, hydroxyl,



R^{14} is hydrogen, C_1–C_{22}-alkyl, C_5–C_{12}-cycloalkyl, C_5–C_{16}-phenylalkyl or phenyl, or M—B—R^5 is a group of the formulae



in which case A must not be a chemical bond and R^{15} is C_1–C_4-alkyl, R^{16} is hydrogen, C_1–C_4-alkyl or C_1–C_4-alkoxy and R^{17} is hydrogen or $_1$–C_{12}-alkyl.

4,958,023

2-PYRIDINECARBOTHIOAMIDES, PROCESSES FOR PREPARATION THEREOF AND PHARMACEUTICAL COMPOSITIONS COMPRISING THE SAME

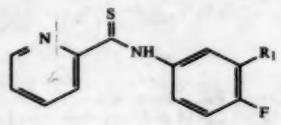
William A. Kinney, Langhorne, Pa., and Nancy E. Lee, Edison, N.J., assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 246,475, Sep. 19, 1988, Pat. No. 4,873,238. This application Jun. 29, 1989, Ser. No. 373,751

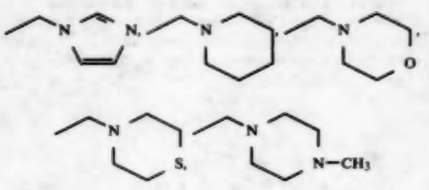
Int. Cl.[5] C07D *213/52, 295/092*

U.S. Cl. 544—58.6 1 Claim

1. The process for producing compounds of structural formula

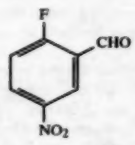


wherein R_1 =



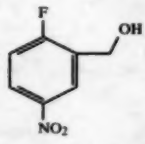
which comprises:

(a) reacting nitro aldehyde of structure



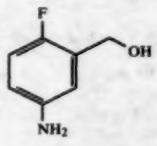
(XI)

with sodium borohydride to form the nitro alcohol of structure

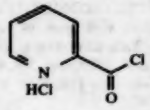


(XII)

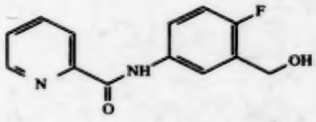
(b) reacting said nitro alcohol with stannous chloride dihydrate to afford the hydroxymethyl aniline of structure



(c) reacting said hydroxymethyl aniline with two equivalents of the acid chloride derivative of (III) of structure

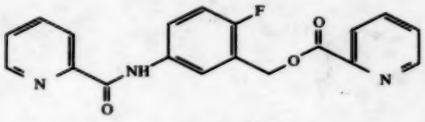


to yield hydroxymethyl amide of structure



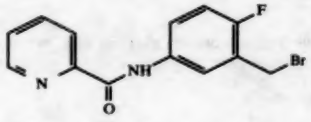
(X)

as well as amide ester of structure

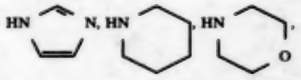


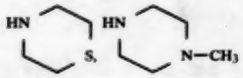
which can be converted to additional said hydroxymethyl amide with potassium carbonate in wet alcohol;

(d) reacting said hydroxymethyl amide with carbon tetrabromide and triphenylphosphine to afford the bromomethyl amide of structure

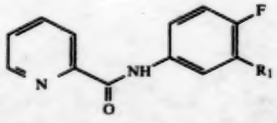


(e) reacting said bromomethyl amide with heterocycles of structure



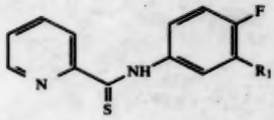


or their sodium salts to yield basic amides of structure



wherein R_1 is as defined above; and

(f) reacting said basic amides with phosphorus pentasulfide in pyridine to afford basic thioamides of structure.



wherein R_1 is as defined above;

(g) and optionally treating said basic thioamides with hydrogen chloride to form the monoor dihydrochloride salt.

4,958,024

PROCESS FOR PREPARING 2-CARBAMOYLOXYALKYL-1,4-DIHYDROPYRIDINE DERIVATIVES

Tetsuji Miyano; Kunio Suzuki, both of Nagoya; Ryosuke Ushijima, and Susumu Nakagawa, both of Okazaki, all of Japan, assignors to Banyu Pharmaceutical Company, Ltd., Tokyo, Japan

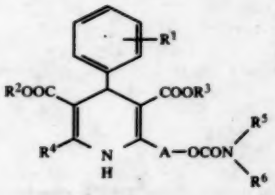
Division of Ser. No. 863,984, May 16, 1986, Pat. No. 4,914,227, which is a division of Ser. No. 517,844, Jul. 27, 1983, abandoned. This application Aug. 10, 1988, Ser. No. 230,418

Claims priority, application Japan, Aug. 6, 1982, 57-136343; Sep. 2, 1982, 57-151706; Oct. 12, 1982, 57-177647

Int. Cl.[5] **C07D** *211/90, 401/12, 403/12*

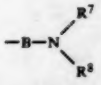
U.S. Cl. 546—249 **5 Claims**

1. A process for preparing 2-carbamoyloxyalkyl-1,4-dihydropyridine derivative represented by the general formula:



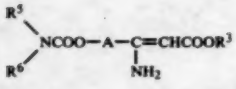
(I)

where R^1 is halogen, cyano, nitro, hydroxyl, di-lower alkyl substituted amino or lower alkoxy, each of R^2 and R^3 is lower alkyl, β-chloroethyl, β-bromoethyl, β-chloropropyl, γ-chloropropyl, ω-chlorobutyl, β,β-dichloroethyl, trifluoromethyl, β,β,β-trichloroethyl, lower alkenyl, lower alkynyl, phenyl, benzyl, hydroxyalkyl, lower alkoxyalkyl, lower alkenyloxyalkyl, β-benzyloxyethyl, β-phenylethyloxyethyl, β-(α-methylbenzyloxy)ethyl, β-phenoxyethyl, β-pyridyloxyethyl, β-phenoxypropyl, β-phenoxybutyl or



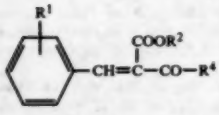
(where B is straight-chained or branched C_{2-4} alkylene, and each of R^7 and R^8 is lower alkyl, benzyl or phenyl, or R^7 and R^8 form, together with the adjacent nitrogen atom, a heterocyclic group), R^4 is hydrogen or lower alkyl, A is C_{1-8} alkylene, and each of R^5 and R^6 is hydrogen, lower alkyl, β-chloroethyl, β-bromoethyl, β-chloropropyl, γ-chloropropyl, ω-chlorobutyl, β,β-dichloroethyl, trifluoromethyl, β,β,β-trichloroethyl, hydroxyalkyl, cycloalkyl, benzyl or phenyl, or R^5 and R^6 form, together with the adjacent nitrogen atom, a heterocyclic group, which comprises:

(a) reacting under cooling, at room temperature, or under warming or heating a 3-amino-3-carbamoyloxyalkylacrylic acid derivative represented by the general formula:



(II)

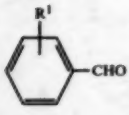
where R^3, R^5, R^6 and A are as defined above, with a benzylidene compound represented by the general formula:



(III)

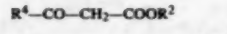
where R^1, R^2 and R^4 are as defined above in water, an inert organic solvent, or a mixture thereof; or

(b) reacting under cooling, or at room temperature, or under warming or heating the 3-amino-3-carbamoyloxyalkylacrylic acid derivative of the general formula II with an aldehyde compound represented by the general formula:



(IV)

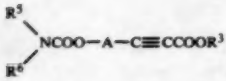
wherein R^1 is as defined above, and a β-keto-ester compound represented by the general formula:



(V)

where R^2 and R^4 are as defined above in water, an inert organic solvent, or a mixture thereof; or

(c) reacting under cooling, or at room temperature, or under warming or heating a 3-carbamoyloxyalkylpropiolic acid derivative represented by the general formula:



(VI)

where R^3, R^5, R^6 and A are as defined above, with the benzylidene compound of the general formula II and ammonia or its salt in water, an inert organic solvent, or a mixture thereof; or

(d) reacting under cooling, or at room temperature, or under warming or heating the 3-carbamoyloxyalkylpropiolic acid derivative of the general formula VI with the aldehyde compound of the general formula IV, the β-keto-ester compound of the general formula V and ammonia or its salt in water, an inert organic solvent, or a mixture thereof.

4,958,025

PREPARATION OF 2-CHLORO-5-CHLOROMETHYLPYRIDINE

Klaus Jelich, Wuppertal, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

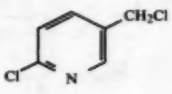
Filed Dec. 4, 1989, Ser. No. 445,816

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1988, 3842358

Int. Cl.[5] **C07D** *213/61*

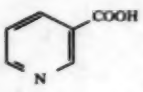
U.S. Cl. 546—345 **2 Claims**

1. A process for the preparation of 2-chloro-5-chloromethylpyridine of the formula



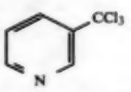
(I)

which comprises reacting nicotinic acid of the formula



(II)

with phosphorus pentachloride to produce 3-trichloromethylpyridine of the formula



(III)

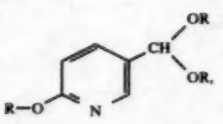
reacting the 3-trichloromethylpyridine in a 2nd step with an alkali metal alkoxide of the formula

(IV)

in which

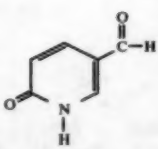
R represents alkyl and

M represents an alkali metal cation, to produce a pyridine ether acetal of the formula



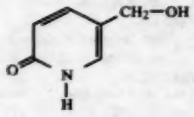
(V)

reacting the pyridine ether acetal in a 3rd step with dilute aqueous acid to produce pyridone aldehyde of the formula



(VI)

hydrogenating the pyridone aldehyde in a 4th step with molecular hydrogen in the presence of a hydrogenation catalyst to produce the pyridylmethanol compound of the formula



(VII)

and reducing the pyridylmethanol compound in a 5th step with a chlorinating agent.

4,958,026

NOVEL DOPAMINE DERIVATIVES, PROCESSES FOR THEIR PREPARATION, AND THEIR USE AS MEDICINAL AGENTS

Klaus Schoellkopf; Rudolf Albrecht; Manfred Lehmann, and Gertrud Schröeder, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesllschaft, Berlin and Bergkamen, Fed. Rep. of Germany

PCT No. PCT/DE85/00275, § 371 Date May 30, 1986, § 102(e) Date May 30, 1986, PCT Pub. No. WO86/01204, PCT Pub. Date Feb. 27, 1986

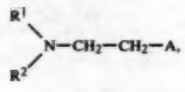
PCT Filed Aug. 14, 1985, Ser. No. 867,365

Claims priority, application Fed. Rep. of Germany, Aug. 15, 1984, 3430310; Jul. 15, 1985, 3525563

Int. Cl.[5] C07D *231/54, 235/02, 249/18*

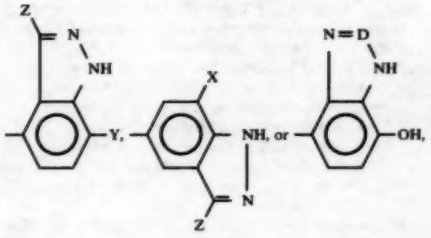
U.S. Cl. 548—259 **5 Claims**

1. A dopamine derivative of Formula



wherein

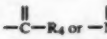
A is



wherein

R^1 and R^2 are identical or different, and each is hydrogen, C_{1-5}-alkyl or allyl,

D is

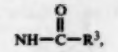


R_4 is hydrogen, C_{1-4}-alkyl, CF_3, or NH_2,

X is NH_2,

or $NH—SO_2—CF_3$, and Y=OH,

Y is NH_2,



$NH-SO_2—CF_3$ or $NH-SO_2—CH_3$, and X=OH, and one of X and Y is always OH, except with the proviso that X and Y are not simultaneously OH and $NH—SO_2—CH_3$, and vice versa, with R^3 being hydrogen or C_{1-4}-alkyl, and Z is H or OH, and, when Z is hydroxy, the residue A can also be in the tautomeric basic form,

or an acid addition salt thereof.

4,958,027

5-NITRO-2-(3,5-DIAMINO-2,4,6-TRINITROPHENYL)-1,2,4-TRIAZOLE, ITS PREPARATION PROCESS AND EXPLOSIVE MATERIAL CONTAINING IT

Francois Laval, Monts, and Pascal Vignane, Tours, both of France, assignors to Commissariat A L'Energie Atomique, Paris, France

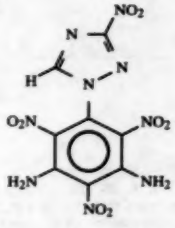
Filed Dec. 6, 1988, Ser. No. 280,555

Claims priority, application France, Dec. 8, 1987, 87 17058

Int. Cl.[5] C07D *249/14;* C06B *25/00*

U.S. Cl. 548—264.8 **2 Claims**

1. 5-nitro-2(3,5-diamino-2,4,6-trinitrophenyl)-1,2,4-triazole in accordance with formula:



(I)

4,958,028

PROCESS FOR THE PREPARATION OF 5-SUBSTITUTED-3-PHENYL IMIDAZOLIDINE-2,4-DIONES

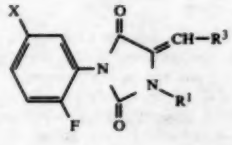
Michael P. Prisbylla, Richmond, Calif., assignor to ICI Americas Inc., Wilmington, Del.

Division of Ser. No. 289,997, Dec. 22, 1988, Pat. No. 4,911,748. This application Jan. 8, 1990, Ser. No. 461,945

Int. Cl.[5] C07D *233/96, 401/06, 409/06, 405/06*

U.S. Cl. 548—309 **4 Claims**

1. A process for the preparation of a compound of the following formula



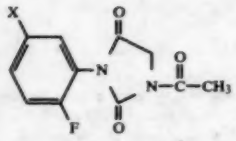
in which:

X is hydrogen or halogen;

R^1 is methyl or ethyl: and

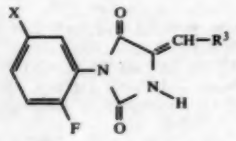
R^3 is C_{1-8}alkyl, C_{3-8}cycloalkyl, phenyl, substituted, phenyl, benzyl, substituted benzyl, styryl, or an aromatic heterocyclic group of 3 to 10 ring atoms; which process comprises

(a) a compound having the formula



(IV)

where X is as defined above, with an aldehyde of the formula R^3—CHO (V), where R^3 is as defined above, to give a compound of the formula



(VI)

and,

(b) reacting the compound of formula VI with a halide R^1—Q; where Q is a halogen.

4,958,029

PROCESS FOR THE PRODUCTION OF ISOINDOLINE DERIVATIVES, NOVEL INTERMEDIATES AND PROCESS FOR THEIR PRODUCTION

Susumu Nakagawa, Okazaki; Satoshi Murase, Nagoya; Ryosuke Ushijima, and Yoshiaki Kato, both of Okazaki, all of Japan, assignors to Banyu Pharmaceutical Co., Ltd., Tokyo, Japan

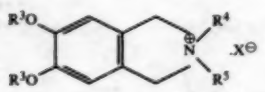
Filed Jan. 5, 1988, Ser. No. 140,996

Claims priority, application Japan, Jan. 13, 1987, 62-5643; Jan. 13, 1987, 62-5644

Int. Cl.[5] C07D *209/58, 209/44*

U.S. Cl. 548—430 9 Claims

1. A compound having the formula:



(II)

wherein R^3 is a hydrogen atom or a hydroxyl-protecting group selected from the group consisting of an acetyl group, a methyl group, a benzyl group and an ethoxycarbonyl group, or two R^3 of vicinal —OR^3 groups together form a methylene group, an ethylene group, a benzylidene group, a methoxymethylidene group, a methoxyethylidene group, an isopropylidene group or a carbonyl group, R^4 and R^5 which may be the same or different are N-protecting groups selected from the group consisting of lower alkyl groups and C_{7-12} aralkyl groups selected from the group consisting of benzyl, 3-methoxybenzyl, 4-methoxybenzyl, 3,4-dimethoxybenzyl, α-methylbenzyl, phenethyl, 3-phenylpropyl, 1-naphthylmethyl and diphenylmethyl, and $X^{\ominus}$ is an anion selected from the group consisting of halide, sulfate, hydrogen sulfate, methylsulfate, p-toluenesulfonate, methanesulfonate and trifluoroacetate.

4,958,030

PROCESS FOR THE PREPARATION OF 3-PHENYLPYRROLE DERIVATIVES

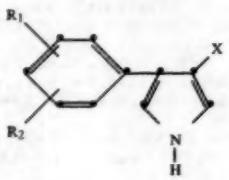
Rudolf W. Pfluger, Zeiningen; Jean Indermühle, Basel, and Franz Felix, Münchenstein, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 283,341, Dec. 12, 1988, abandoned. This application Oct. 11, 1989, Ser. No. 419,793

Int. Cl.[5] C07D *207/02*

U.S. Cl. 548—526 26 Claims

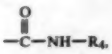
1. A process for the preparation of a 3-phenylpyrrole derivative of formula I



(I)

wherein

X is cyano,—CO—R_3, —CO—OR_3 or



R_1 and R_2 are each independently of the other hydrogen, C_1–C_6alkyl,

C_1–C_6alkoxy, $C_1$14 C_6alkylthio, nitro, cyano, halogen or C_1–C_6-haloalkyl, or

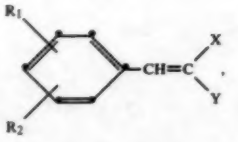
R_1 and R_2, when taken together, are methylenedioxy or difluoromethylenedioxy,

R_3 is C_1–C_6alkyl, C_1–C_6haloalkyl, phenyl or benzyl, or phenyl or benzyl which are each substituted by halogen, methyl, methoxy or methylthio,

R_4 is hydrogen, C_1–C_6haloalkyl, phenyl or benzyl, or phenyl or benzyl which are each substituted by halogen, methyl, methoxy or methylthio, which process comprises

(a) reacting N-(p-tolylsulfonyl)methyl formamide, in an inert solvent and in the presence of an organic base, with phosphoroxy chloride, mixing the reaction solution with water, separating the aqueous phase of the resultant two-phase mixture, and

(b) reacting the organic phase containing (p-tolylsulfonyl)methyl isocyanide direct with a compound of formula II



(II)

wherein X, R_1 and R_2 are as defined for formula I, Y is —CO—NHR_4, —CO—R_5 or —S—R_5, R_5 is C_1–C_6alkyl, C_1–C_6haloalkyl, phenyl or benzyl, or phenyl or benzyl which are each substituted by halogen, methyl, methoxy or methylthio, and R_4 is as defined for formula I, in the presence of a base.

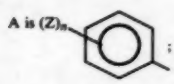
4,958,031

CROSSLINKING NITROMONOMERS

Clyde H. Sheppard, Bellevue, Wash., and Hyman R. Lubowitz, Rolling Hills Estates, Calif., assignors to The Boeing Company, Seattle, Wash.

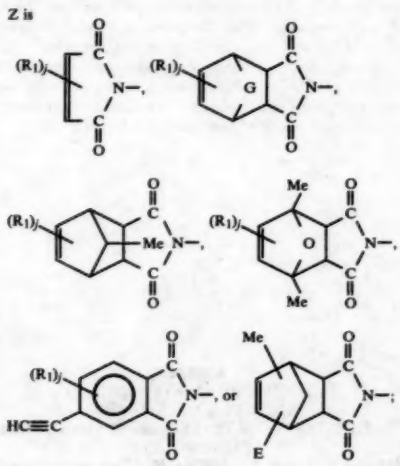
Division of Ser. No. 16,703, Feb. 20, 1987, Pat. No. 4,851,495. This application Jul. 5, 1988, Ser. No. 215,090
Int. Cl.[5] C07D *491/00*
U.S. Cl. 548—431 15 Claims

1. A crosslinking nitromonomer of the formula A—NO_2 wherein:



n is 2;

Z is



E is allyl or methallyl;

R_1 is any of lower alkyl, lower alkoxy, aryl, hydroxyl substituted aryl or halo su substituted aryl;

j is 0, 1, or 2;

G is —CH_2—, —O—, —S—, or —SO_2—; and

Me is methyl.

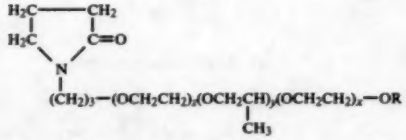
4,958,032

N-ALKOXYLATED ETHER 2-PYRROLIDONES

Anthony J. O'Lenick, Jr., 743 Ridgeview Dr., Lilburn, Ga. 30247

Filed Apr. 5, 1989, Ser. No. 333,539
Int. Cl.[5] C07D *207/27*
U.S. Cl. 548—543 7 Claims

1. A substituted lactam conforming to the following formula;



wherein;

R is a alkyl having from 10 to 36 carbon atoms;

x, y and z are independently integers from 0 to 50, with the proviso that the sum of x+y+z be greater than zero.

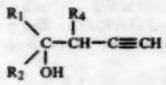
4,958,033

PROCESS FOR PREPARING ALCOHOLS

Yukihisa Takisawa; Nobuharu Kono; Kenji Saito, and Hiroshi Yamachika, all of Osaka, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

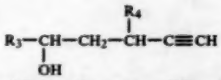
Continuation of Ser. No. 563,524, Dec. 20, 1983, abandoned. This application Sep. 26, 1986, Ser. No. 912,220
Claims priority, application Japan, Dec. 24, 1982, 57-230585
Int. Cl.[5] C07C *29/00*; C07D *281/00*
U.S. Cl. 549—59 11 Claims

1. A process for preparing an alcohol of the formula:



(I)

or

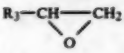


(I')

wherein R_1 and R_2 are, the same or different, each a hydrogen atom, a straight, branched or cyclic alkyl, alkenyl or alkynyl group having not more than 14 carbon atoms, a phenyl group, a naphthyl group, a benzyl group, a furyl group or a thienyl group, provided that when either one of R_1 and R_2 represents a hydrogen atom, the other is not a hydrogen atom, R_3 is a hydrogen atom, a straight or branched alkyl group having not more than 6 carbon atoms or a phenyl group and R_4 is a hydrogen atom or a methyl group, by reacting a carbonyl compound of the formula:

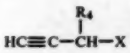
(II)

wherein R_1 and R_2 are each as defined above, or an oxirane of the formula:



(III)

wherein R_3 is as defined above, magnesium and a propargyl halide of the formula:



(IV)

wherein X is a halogen atom and R_4 is as defined above, followed by hydrolysis, wherein the carboxyl compound (II) or the oxirane compound (III) and the propargyl halide (IV) are simultaneously charged into a reaction system of magnesium in an inert solvent in the presence of zinc or a halide thereof.

4,958,034

ALKENYL SUCCINIC ANHYDRIDES PROCESS

Paul S. Hale, and Kju H. Shin, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Nov. 13, 1989, Ser. No. 436,072
Int. Cl.[5] C07D *307/60*
U.S. Cl. 549—255 20 Claims

1. A process for making an alkenyl succinic anhydride hav-

ing reduced levels of tar and color bodies, said process comprising reacting maleic anhydride with an aliphatic olefin containing about 4–250 carbon atoms at a temperature of about 190°–250° C. in the presence of a stabilizing amount of an arylfluorophosphite, said arylfluorophosphite being characterized by having at least one substituted or unsubstituted aryloxy group and at least one fluorine atom bonded directly to a trivalent phosphorus atom.

4,958,035

PROCESS FOR SYNTHESIZING CHROMANES

Richard Barner, Witterswil, and Josef Hübscher, Nunningen, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.Y.

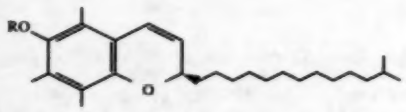
Division of Ser. No. 235,257, Aug. 23, 1988, Pat. No. 4,876,369. This application Jun. 29, 1989, Ser. No. 373,000

Claims priority, application Switzerland, Aug. 25, 1987, 3244/87

Int. Cl.[5] C07D *311/70*

U.S. Cl. 549—408 **2 Claims**

1. Compound of the formula



wherein OR is a hydrolyzable ether group.

4,958,036

ENANTIOMERICALLY SELECTIVE SYNTHESIS OF CERTAIN N-SUBSTITUTED-2-(CARBAMYL 7-OXABICYCLO[2.2.1]HEPTANE-3-CARBOXYLIC ACIDS

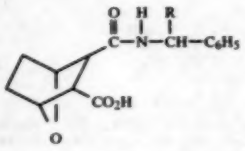
John K. Thottathil, Trenton, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 276,724, Jan. 28, 1988, Pat. No. 4,851,553, which is a division of Ser. No. 157,181, Jan. 27, 1988, Pat. No. 4,816,579, which is a division of Ser. No. 52,296, May 21, 1987, Pat. No. 4,743,697, which is a division of Ser. No. 870,564, Jun. 4, 1986, Pat. No. 4,687,865. This application Apr. 17, 1989, Ser. No. 339,037

Int. Cl.[5] C07D *307/00*

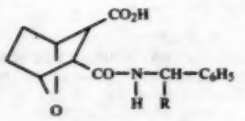
U.S. Cl. 549—463 **2 Claims**

1. A method for preparing 7-oxabicycloheptane acid compounds of the structure



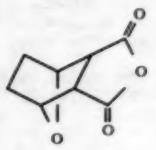
IIA

or



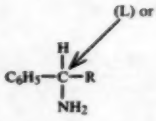
IIB

wherein R is alkyl, CO_2H, or CO_2 alkyl, which comprises reacting mesoanhydride



B

with an optically active amine of the structure



C

in the presence of an inert organic solvent to form the above acid compounds wherein the product formed comprises a mixture of IIA and IIB, wherein when the (D) isomer of amine C is employed as a reactant the product mixture consists of about 85 parts IIB and 15 parts IIA, and wherein when the (L) isomer of amine C is employed as a reactant the product mixture consists of about 85 parts IIA and 15 parts IIB.

4,958,037

PRECURSORS AND SYNTHESIS OF METHYL-9-OXO-11APHA, 16-DIHYDROXY-16-VINYL-5-CIS-13-TRANS-PROSTADIENOATES

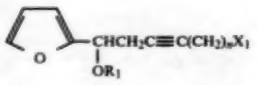
Middleton B. Floyd, Jr., Suffern, N.Y., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 760,023, Jul. 29, 1985, abandoned. This application Apr. 25, 1988, Ser. No. 185,621

Int. Cl.[5] C07D *307/32, 307/42, 307/54*

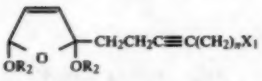
U.S. Cl. 549—476 **9 Claims**

1. A compound of the formula



wherein R_1 is selected from the group consisting of hydrogen and C_1–C_4 alkyl; X_1 is selected from the group consisting of halogen, cyano, C_1–C_4 alkoxycarbonyl, carboxy and tri-(C_1-C_4alkoxy)methyl; and n is an integer 2–4 inclusive.

2. A compound of the formula



wherein R_2 is C_1–C_4 alkyl; X_1 is selected from the group consisting of halogen, cyano, C_1–C_4 alkoxycarbonyl, carboxy and tri-(C_1–C_4 alkoxy)methyl; and n is an integer 2–4 inclusive.

4,958,038

ORGANOTITANIUM COMPOSITIONS USEFUL FOR CROSS-LINKING

Kenneth C. Smeltz, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 941,076, Dec. 8, 1986, abandoned. This application Mar. 20, 1989, Ser. No. 326,551

Int. Cl.[5] C07F 7/28

U.S. Cl. 556—55 32 Claims

1. A process which comprises (A) combining (i) glycerol, erythritol, arabitol, xylitol, sorbitol, dulcitol, mannitol, inositol, a monosaccharide, or a disaccharide, (ii) water and (iii) lactic acid, glycolic acid, malic acid, citric acid, tartaric acid, saccharic acid, gluconic acid, glyceric acid or mandelic acid to provide an aqueous solution of the polyol and the α-hydroxy carboxylic acid, and (B) then at an alkaline pH of 10 or less reacting said solution with a tetravalent titanium compound of an inorganic acid at an α-hydroxy carboxylic acid:titanium mol ratio between about 0.5:1 and about 4:1 and a polyol:titanium mol ratio between about 0.25:1 and about 2:1.

4,958,039

MODIFIED FLUOROCARBONYLIMINO BIURETS

Engelbert Pechhold, Chadds Ford, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

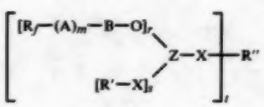
Filed Aug. 24, 1984, Ser. No. 644,089

Int. Cl.[5] C07F 7/10; D06M 13/28, 1/00, 13/40

U.S. Cl. 556—421 25 Claims

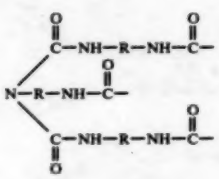
1. A fluorocarbonylimino biuret of the formula:

$$[R_f-(A)_m-B-O]_p-Z-[X-R']_q \text{ or}$$



wherein

Z is a tris-(carbonylimino)biuret radical of the general formula



in which R is an aliphatic or cycloaliphatic residue of 4 to 20 carbon atoms, optionally substituted with alkyl or alkoxy substituents;

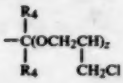
R_f is a fully-fluorinated straight or branched aliphatic radical of 3 to 20 carbon atoms which can be interrupted by oxygen atoms;

A is a divalent radical consisting of $—SO_2NR_313$, $—CONR_3$, —S—, or $—SO_2—$, wherein R_3 is H or alkyl or 1 to 6 carbon atoms;

B is a divalent linear hydrocarbon radical $—C_nH_{2n}—$ which can be end-capped by

$$+OCH_2CH_2\frac{}{}, \quad +OCH_2—\underset{|}{\overset{CH_3}{CH}}\frac{}{}, \quad +OCH_2—\underset{|}{\overset{CH_2Cl}{CH}}\frac{}{} \text{ or}$$

-continued



wherein n is 0 to 12,

z is 1 to 50, and R_4 is H or lower alkyl;

X is O, S or NR_5, wherein R_5 is H or lower alkyl;

R′ is a monovalent fluorine-free alicyclic, aromatic or heterocyclic radical substituted with one or more of the following: —Cl, —Br, OR_6, CO_2R_6, $—Si(OR_6)_3$, $—N^{\oplus}(R_6)_3$ or vicinal —OH/—Cl or —OH/—Br, wherein R_6 is alkyl 1 to 18 carbon atoms,

R″ is any substituted or unsubstituted fluorine containing fluorine-free aliphatic, alicyclic, aromatic or heterocyclic radical with a valency of at least 2 and not more than 100;

m is zero or 1;

p is 1 or 2;

q is (3−p), i.e., either 2 or 1;

r is 1 or 2;

s is (2−r); and

t is an integer of 2 to 100.

4,958,040

PROCESS FOR THE PREPARATION OF DIORGANOHALOGENOSILANES

Hiroshi Yoshioka, Tokyo; Masaaki Yamaya, Annaka; Hiromi Ohsaki, and Akira Hayashida, both of Joetsu, all of Japan, assignors to Shin-Etsu Chemical

Filed Sep. 21, 1989, Ser. No. 410,202

Claims priority, application Japan, Sep. 28, 1988, 63-243685

Int. Cl.[5] C07F 7/08

U.S. Cl. 556—467 17 Claims

1. A process for the preparation of a diorganohalogenosilane which comprises reacting a diorganodihalogenosilane and at least one organosilicon compound having at least one ≡Si—H bond in the molecule and selected from polysilanes, polycarbosilanes and polysilphenylenes in the presence of a Lewis acid.

4,958,041

METHODS FOR PRODUCING DIORGANODIALKOXYSILANES

Jurgen Graefe, Selm-Cappenberg; Wolfram Uzick, Dortmund, and Udo Weinberg, Bergkamen, all of Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Bergkamen, Fed. Rep. of Germany

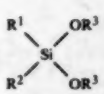
Filed Jun. 26, 1989, Ser. No. 371,397

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1988, 3821483

Int. Cl.[5] C07F 7/18

U.S. Cl. 556—480 28 Claims

1. A method of selective production of diorganodialkoxysilane having the general formula:



which comprises reacting at a temperature of about 0° to about 90° C. a tetraalkoxysilane having the formula $Si(OR^3)_4$ or a monoorganotrialkoxysilanes having the formula $R^1Si(OR^3)_3$ with an alkylating effective amount of a Grignard reagent having the formula R^2MgX, wherein

X is Br, Cl or I;

R^1 and R^2 are independently an alkyl group or a cycloalkyl group having 3 to 10 carbon atoms, wherein at least one of R^1 and R^2 is a branched alkyl group having the branched alkyl group at the α- or β- carbon to the Si;

R^1 is R^2 when reacting the tetraalkoxysilane with the Grignard reagent; and.

each R^3 may be the same or different and is an alkyl group having 1 to 5 carbon atoms.

4,958,042

DIMERIZATION OF ACRYLONITRILE

Gordon Shaw, Guisborough, and Jose Lopez-Merono, Marske, both of England, assignors to Imperial Chemical Industries PLC, London, England

Filed Oct. 26, 1988, Ser. No. 262,582

Claims priority, application United Kingdom, Oct. 28, 1987, 8725218

Int. Cl.[5] C07C *253/30, 255/04*

U.S. Cl. 588—363 **11 Claims**

1. In a process which comprises dimerizing acrylonitrile to a linear C_6 dinitrile in a homogeneous liquid phase which comprises a phosphinite or phosphonite catalyst and an inert proton donating solvent, an aromatic hydrocarbon solvent and an aliphatic or cycloaliphatic hydrocarbon solvent, the improvement wherein the aliphatic or cycloaliphatic solvent is one which boils at a temperature higher than the aromatic solvent, inert proton donating solvent, and acrylonitrile, the boiling point of the aliphatic or cycloaliphatic hydrocarbon solvent being at least 40° higher than that of the aromatic solvent and inert proton donating solvent, and the aromatic solvent, unconverted acrylonitrile and inert proton donating solvent are evaporated or distilled from the reaction product to leave a mixture which separates into two phases, one of which comprises a major proportion of the catalyst and the other of which comprises a major proportion of the linear C_6 dinitrile.

4,958,043

NOVEL METHINE COMPOUNDS, POLYMERS CONTAINING THEM AND FORMED ARTICLES THEREFROM

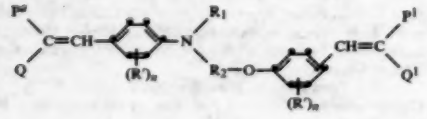
Max A. Weaver; Wayne P. Pruett, both of Kingsport, and Samuel D. Hilbert, Jonesborough, all of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 18, 1988, Ser. No. 182,633

Int. Cl.[5] C07C *121/70*

U.S. Cl. 558—403 **10 Claims**

1. A compound having the structural formula:



wherein:

R′ is selected from chlorine, bromine, fluorine, alkyl, alkoxy, phenyl, phenoxy or phenylthio;

n is 0, 1, or 2;

R_1 is selected from:

C_5 up to C_7 cycloalkyl,

phenyl,

—R_2—Z—B′—CH=C(P^a)Q, wherein R_2, P^a and Q are as defined below, Z is O or S, and B′ is arylene,

straight or branched alkenyl,

straight or branched alkyl,

straight or branched alkyl substituted with at least one of:

phenylcarbamoyloxy,

alkanoylamino,

carboxy,

alkylsulfonyl,

vinylsulfonyl,

acrylamido,

sulfamyl,

alkylsulfonamido,

phenylsulfonamido,

alkoxycarbonylamino,

N-alkylcarbamoyloxy,

groups of the formula:

—O—R_6, —S—R_6 or —$SO_2CH_2CH_2SR6$, wherein R_6 is selected from:

alkyl, or

aryl,

—$CONR_7R_7$, —$SO_2NR_7R_7$,

wherein

each R_7 is independently selected from:

H,

alkyl,

phenoxyalkyl,

alkylsulfonylalkyl,

alkylthioalkyl,

alkanoyloxyalkyl,

aryl;

—OXR_8, —$NHXR_8$ or —XR_8, wherein X is —CO—, —COO—, or —SO_2—; and each R_8 is selected from:

alkyl,

cycloalkyl,

phenoxyalkyl,

alkylsulfonylalkyl,

alkylthioalkyl,

alkanoyloxyalkyl; and when X is —CO—, R_8 can further be selected from:

H,

alkenyl,

amino,

alkyamino,

dialkylamino,

arylamino,

aryl,

alkoxy,

alkanoyloxyalkoxy,

phenoxy,

alkylphenoxy,

carboxyphenoxy,

alkoxyphenoxy,

carbalkoxyphenoxy, or

halogenophenoxy;

R_2 is selected from:

alkylene,

alkylene substituted with —Z—B′—CH=C(P^a)Q, wherein Z and B′ are as defined above and P^a and Q are as defined below,

arylene,

aralkylene,

alkylene-O-alkylene,

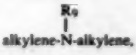
alkylene-O-arylene-O-alkylene,

alkylene-arylene-alkylene,

alkylene-cyclohexylene-alkylene,

alkylene-S-alkylene,

alkylene-SO_2-alkylene,



wherein R_9 is selected from:

alkyl,

aryl,

alkanoyl,

alkylsulfonyl,

aroyl, or

arylsulfonyl;

P^a, Q, P^1 and Q^1 are each independently selected from:

cyano,

carbalkoxy,

carbocycloalkoxy,

carbaryloxy,

carbaralkyloxy,

carbalkenyloxy,

carbamyl,

carboxy,
alkanoyl,
aroyl,
N-alkylcarbamyl,
N-alkyl-N-arylcarbamyl,
N,N-dialkylcarbamyl,
N-arylcarbamyl,
N-cyclohexylcarbamyl,
—SO_2—alkyl,
—SO_2—aryl,
aryl;

with the proviso that at least one of P^a, Q, P^1, or Q^1 is cyano, and at least one of R_1, R_2, P^a, Q, P^1 and Q^1 is a group reactive under condensation polymerization conditions, or bears a group reactive under condensation polymerization conditions, so as to incorporate said compound into the resulting polymer, said group selected from:

carboxy,
carbalkoxy,
carbaryloxy,
N-alkylcarbamyloxy,
alkanoyloxy,
chlorocarbonyl,
carbamyloxy,
amino,
alkylamino,
hydroxyl,
N-phenylcarbamyloxy,
cyclohexanoyloxy, or
carbocyclohexyloxy;

wherein in each of the above definitions the alkyl or alkylene moieties or portions of the various groups contain up to 8 carbon atoms, straight or branched chain, aryl moieties or portions of the various groups are carbocyclic species and contain in the range of 6 up to 10 carbon atoms; and wherein each alkyl, alkylene, alkoxy, aryl, or cycloalkyl moiety or portion of a group or radical can be further substituted with hydroxy, acyloxy, alkyl, cyano, alkoxycarbonyl, halogen, carbonylhalide, alkoxy, aryl, aryloxy, cycloalkyl, amino, alkylamino, alkanoylamino, or carboxy groups.

4,958,044

2-AZA-4-(ALKOXYCARBONYL)SPIRO[4,5]-DECAN-3-ONE

Hans P. Mettler, Brig-Glis; Gareth Griffiths, Visp; Lester Mills, Naters, and Felix Previdoli, Brig, all of Switzerland, assignors to Lonza Ltd., Gampel, Switzerland

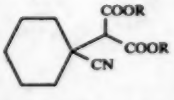
Division of Ser. No. 400,820, Aug. 30, 1989. This application Jan. 8, 1990, Ser. No. 461,973

Claims priority, application Switzerland, Sep. 1, 1988, 3272/88; Apr. 12, 1989, 1382/89; Apr. 12, 1989, 1383/89

Int. Cl.[5] C07C *255/46*

U.S. Cl. 558—431 **3 Claims**

1. (1-Cyanocyclohexyl)malonic acid dialkyl ester of the formula:



(3)

wherein R is a lower alkyl radical of 1 to 4 C atoms.

4,958,045

INTERMEDIATES FOR PREPARING 1,8-BRIDGED 4-QUINOLONE-3-CARBOXYLIC ACIDS

Klaus Grohe, Odenthal, and Michael Schriewer, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

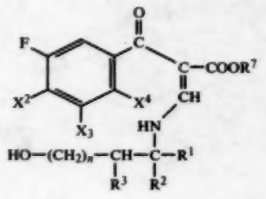
Division of Ser. No. 172,612, Mar. 24, 1988, which is a division of Ser. No. 874,182, Jun. 13, 1986, Pat. No. 4,762,831. This application Mar. 30, 1989, Ser. No. 331,339

Claims priority, application Fed. Rep. of Germany, Jun. 22, 1985, 3522406

Int. Cl.[5] C07C *219/22, 215/28*

U.S. Cl. 560—20 **6 Claims**

1. An enamine of the formula



in which

X^2 is fluorine, chlorine or methyl,
X^3 is fluorine or nitro,
X^4 is fluorine or chlorine,
R^1 to R^4 each independently is hydrogen, C_{1-3}-alkyl or -hydroxyalkyl or -haloalkyl, or R^1 and R^2 or R^2 and R^3 together are —$(CH_2)_3$— or —$(CH_2)_4$—,
R^7 is H or C_{1-4}-alkyl, and
n is 0 or 1.

4,958,046

HYDROXYPROPAFENONE GLYCERIDES

Joerg Rosenberg, Ludwigshafen; Juergen Heberger, Schifferstadt; Hans-Heinrich Gruenhagen, Ludwigshafen; Egon Brode, Frankenthal, and Gerda von Philipsborn, Weinheim, all of Fed. Rep. of Germany, assignors to Knoll AG, Ludwigshafen, Fed. Rep. of Germany

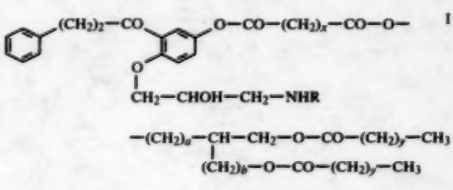
Filed Sep. 19, 1989, Ser. No. 410,050

Claims priority, application Fed. Rep. of Germany, Oct. 7, 1988, 3834132

Int. Cl.[5] C07C *69/353*

U.S. Cl. 560—142 **3 Claims**

1. A hydroxypropafenone glyceride of the formula I



I

where

R is n-propyl or 1,1-dimethylpropyl,
x is 2 or 3,
y is 12, 14, 16, 18 or 20, and
a and b differ from one another and are 0 or 1, and the stereoisomers thereof.

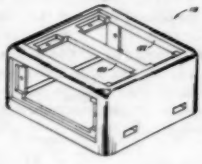
ELECTRICAL

4,958,047

MONUMENT FITTING

Edward C. Bartee, Fairfield, Ohio, assignor to Square D Company, Palatine, Ill.

Filed Jan. 13, 1989, Ser. No. 296,631
Int. Cl.[5] H02G *3/08*
U.S. Cl. 174—48 **13 Claims**



1. A monument fitting apparatus for an electrical raceway system to be placed in a floor, comprising:

an elongated, rectangular parallelepiped frame having a top, a bottom, longer first and second sides, and shorter third and fourth sides;

said top having a first electrical outlet mounting means defined therein for mounting an electrical outlet for top access thereto;

said first and second longer sides having second and third electrical outlet mounting means defined therein, respectively, for mounting electrical outlets for side access thereto;

wherein said frame is dimensioned so that when one electrical outlet is mounted in said first mounting means for top access said one electrical outlet prevents other electrical outlets from being mounted in said second and third mounting means, and when said first mounting means is empty electrical outlets can be mounted in both of said second and third mounting means for side access; and

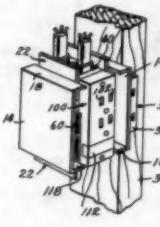
wherein said first, second and third mounting means are further characterized as providing a means for permitting electrical outlets to be relocated between top and side access positions after said monument fitting apparatus is placed in service.

4,958,048

MODULAR ELECTRICAL SYSTEM

Peter D. Bell, P.O. Box 788, Merritt Island, Fla. 32952

Filed Jan. 10, 1989, Ser. No. 295,399
Int. Cl.[5] H02G *3/12*
U.S. Cl. 174—53 **25 Claims**



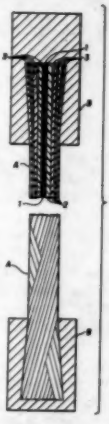
1. A modular electrical wiring assembly including an outlet box and an electrical device slidably received within said box, said outlet box including positioning means for receiving and positioning said electrical device, and locking means on said electrical device engageable with said positioning means for a releasable fixing of said electrical device within said box and to said positioning means, said positioning means comprising an elongate positioning panel within said box, said panel having opposed inner and outer faces, said electrical device engaging against the inner face of said positioning panel, said locking means engaging the outer face of said positioning panel and clamping said electrical device thereagainst.

4,958,049

ELONGATED ELECTRICALLY INSULATING SUPPORT STRUCTURE AND RELEVANT PREPARATION METHOD

Massimo Alfieri; Zelindo Lodi, and Gianfranco Trevisan, all of Parma, Italy, assignors to Fidenza Vetraria S.p.A., Milan, Italy

Filed Mar. 16, 1988, Ser. No. 169,040
Claims priority, application Italy, Mar. 19, 1987, 19753 A/87
Int. Cl.[5] H01B *17/56, 19/00*
U.S. Cl. 174—209 **14 Claims**



1. An elongated electrically insulating support structure, made of fiberglass-reinforced resin, comprising a central cylindrical body and ends having the shape of solids having a surface of revolution, with axial symmetry, having diameters larger than the diameter of the central cylindrical body, with which they are radiused without solution of continuity, wherein said central cylindrical body and said ends consist of superimposed and crossed layers of glass filament impregnated with a thermosetting resin wound with a helical winding angle smaller than 90°, wherein the superimposed and crossed layers of glass filament impregnated with a thermosetting resin are alternated, in the vicinity of the end portions of the cylindrical element, with further layers of glass filament impregnated with a thermosetting resin wound with a winding angle larger than the helical winding angle of said superimposed and crossed layers of glass filament impregnated with a thermosetting resin.

5. A method for making an elongated electrically insulating support structure, comprising:

(a) winding around a cylindrical element at least one continuous glass filament, impregnated with a thermosetting resin, with a helical winding angle smaller than 90;

(b) alternating and superimposing upon the helical windings, in the vicinity of the end portions of the cylindrical element, other windings, with a winding angle larger than the winding angle of the preceding step (a); and

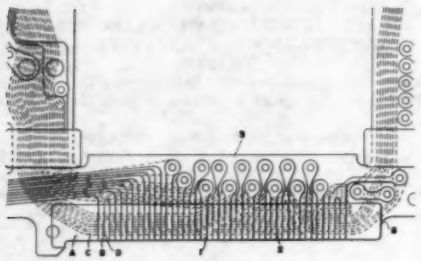
(c) polymerizing and curing the impregnating resin.

4,958,050

FLEXIBLE PRINTED CIRCUIT BOARD

Shungi Oku, and Akikazu Kosho, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 12, 1989, Ser. No. 351,646
Claims priority, application Japan, May 13, 1988, 63-63902
Int. Cl.[5] H05K *1/00*
U.S. Cl. 174—261 **11 Claims**



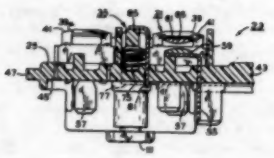
1. A flexible printed circuit board comprising:
an insulating flexible substrate;
an adhesion area on a front surface of said substrate, said adhesion area capable of being glued to a different electrical element by an anisotropic conductive adhesive;
a plurality of first conductive terminals disposed in at least said adhesion area on the front surface of said substrate for providing external connections, said first conductive terminals in said adhesion area capable of being glued and connected to a plurality of different conductive terminals of the different electrical element by the anisotropic conductive adhesive; and
a plurality of conductive patters disposed on a rear surface of said substrate, said first conductive terminals in said adhesion area partly overlaying while partly not overlaying said rear conductive patterns.

4,958,051

TERMINAL BOARD ASSEMBLY

Lynn E. Fisher, Ft. Wayne, Ind.; Richard A. Wandler, Clinton, Iowa, and James P. Frank, Rock Falls, Ill., assignors to General Electric Company, Fort Wayne, Ind.

Division of Ser. No. 203,904, Jun. 8, 1988, Pat. No. 4,856,152, which is a division of Ser. No. 33,975, Apr. 3, 1987, Pat. No. 4,781,726. This application Apr. 5, 1989, Ser. No. 333,537
Int. Cl.[5] H01H *1/24, 35/10*
U.S. Cl. 200—80 R **23 Claims**



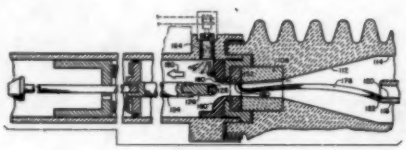
1. A terminal board assembly for a dynamoelectric machine comprising:
a body formed of a dielectric material and including a pair of generally opposite faces thereon;
at least a pair of spaced apart bosses on said body extending from one of said opposite faces thereof, respectively;
a pair of terminals secured to said body at least generally adjacent said bosses and including a pair of deformed portions arranged at least in part in overlaying relation with said bosses, respectively, and at least one of said terminals having an electrical connector section extending beyond the other of said opposite faces on said body;
terminal means for securement to said body and including a contact section disposed generally in overlaying relation with said one opposite face on said body and arranged generally in spaced apart relation with said at least one terminal, and another electrical connector section on said terminal means extending beyond said other opposite face on said body;
a contact on said contact section of said terminal means;
a generally elongate resilient switch element having a pair of opposite ends, one of said opposite ends being connected in electrical conductive engagement with said deformed portion of said at least one terminal, and the other of said opposite ends being biased toward said contact on said contact section of said terminal means;
another contact on said switch element at least generally adjacent said other opposite end thereof and arranged to make with and break from said first named contact;
an actuating lever including a pair of generally opposite trunnions pivotally received between said bosses and at least said deformed portions of said at least one terminal and the other of said terminals, respectively, and extension means on said actuating lever for engagement with said switch element at least generally adjacent said other opposite end thereof; and
resilient means biased between said body and said actuating lever for pivotally urging said actuating lever about its trunnions toward a position engaging said extension means with said switch element at least generally adjacent said other opposite end thereof to break said another contact from said first named contact.

4,958,052

ARC SEVERING AND DISPLACEMENT METHOD AND APPARATUS FOR FAULT CURRENT INTERRUPTION

William R. Mahieu, Rural Rte. 4, P.O. Box 23, Centralia, Mo. 65240

Continuation-in-part of Ser. No. 310,794, Feb. 14, 1989, Pat. No. 4,904,977. This application Dec. 18, 1989, Ser. No. 454,705
Int. Cl.[5] H01H *33/70*
U.S. Cl. 200—148 R **21 Claims**



1. Apparatus for interrupting currents in a high voltage network, comprising:
a source of a dielectric gas adapted for extinguishing an electric arc;
conduit means defining a confined channel for conveying said dielectric gas along a path from said source through the confined channel;
a first electrode disposed in said conduit means having an exposed surface in said confined channel generally parallel to the direction of gas flow therethrough;
a second electrode in conductive relation with said first electrode during normal operation and disposed down-

stream from said first electrode at the time of current interruption;

said first and second electrodes having means for conductive connection to a current path in the high voltage network;

a dielectric surface exposed in said confined channel generally parallel to the direction of gas flow therethrough, downstream from said first electrode and contiguous with the exposed surface of said first electrode to form a substantially continuous surface; and

means for releasing said dielectric gas from said source when the current in the network approaches zero so as to impart high velocity flow of the dielectric gas over said substantially continuous surface along a path intersecting an electrical arc formed between said first and second electrodes and so as to sever the electrical arc from said first electrode, and displace the severed arc portion toward said dielectric surface.

4,958,053

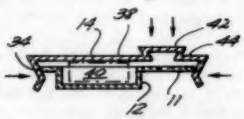
CARRIER TAPE AND METHOD OF MANUFACTURING THE SAME

Hugo Boeckmann, Arlington Hts., and Donald Van Erden, Wildwood, both of Ill., assignors to Illinois Tool Works, Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 46,259, May 4, 1987. This application May 17, 1988, Ser. No. 195,034

Int. Cl.[5] B65D *73/02*

U.S. Cl. 206—330 **14 Claims**



1. A carrier tape comprising:

an elongated base strip;

an elongated cover strip formed of a resilient plastic material generally coextensive in length with said base strip, said cover strip having a top surface, opposed sidewalls extending downwardly from said top surface and having at least portions spaced apart from each other a distance substantially equal to the width of said base strip; and,

means integrally formed with said cover strip for biasing said sidewall portions toward each other in response to a downward force applied to said cover strip top surface.

4,958,054

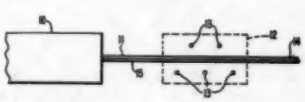
DIELECTRIC DRYING OF HOT PLASTIC FOOD EXTRUDATE

Lewis C. Keller, Watauga, and Cecil A. Bowles, Lewisville, both of Tex., assignors to Fritto-Lay Inc., Dallas, Tex.

Filed Oct. 29, 1986, Ser. No. 924,551

Int. Cl.[5] H05B *6/62*

U.S. Cl. 219—10.55 M **7 Claims**



3. A method of producing an extruded food product comprising extruding a hot plastic food material from a food extruding zone at a temperature of between about 212° F. and 400° F., and dielectrically heating the extruded material in a dielectric heating zone while said material is still in a plastic state to dry said material.

4,958,055

CONTROL CIRCUIT FOR A REFRIGERATOR COMBINED WITH A MICROWAVE OVEN

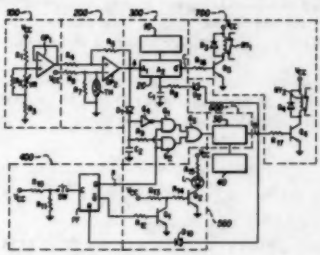
Jae E. Shim, Kyunggi-do, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Rep. of Korea

Filed May 17, 1989, Ser. No. 353,035

Claims priority, application Rep. of Korea, May 17, 1988, 1988-5743

Int. Cl.[5] H05B *6/68*

U.S. Cl. 219—10.55 B **2 Claims**



1. A control circuit for use in controlling a refrigerator circuit combined with a microwave oven, comprising:

a signal delay selecting and comparing means, including a signal comparator, for controlling the start-up of the refrigerator circuit, the refrigerator circuit consuming a relatively small current, and the microwave oven requiring a relatively large current, and including a logic circuit for controlling the comparator;

a start sensing means, having a flip-flop toggled by a start switch, for sensing the start of the microwave oven;

a display means, connected to said start sensing means, for displaying the operation of the microwave oven;

a timer means for causing a delay between the operation of said refrigerator circuit and said microwave oven; and

a load driving means for driving said refrigerator circuit and said microwave oven, having at least two driving circuits connected to said sensing means and said timer means.

4,958,056

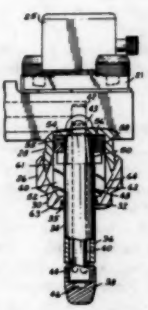
ELECTRODE HOLDER

Anthony J. Tomac, Troy, Mich., assignor to C. M. Smillie & Company, Ferndale, Mich.

Filed Jan. 16, 1990, Ser. No. 465,708

Int. Cl.[5] B23K *11/31*

U.S. Cl. 219—120 **15 Claims**



1. An electrode combination comprising:

an electrode holder;

an electrode;

means to properly position said electrode relative to said holder;

said electrode having a tip at one axial end and a conical portion at the opposed axial end, said conical portion being of a first diameter at said opposed axial end and diverging outwardly to a second diameter, said second diameter being greater than said first diameter;

said means to properly position including said electrode holder having a cylindrical ring portion with an inner periphery and an outer periphery, said inner periphery receiving an inner O-ring in a groove, said inner periphery of said ring portion being of a third diameter, said third diameter being intermediate said first and second diameters;

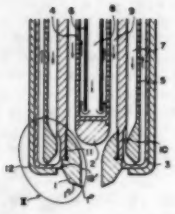
said ring portion receiving said conical portion until said conical portion abuts said inner O-ring to properly position said electrode relative to said holder.

4,958,057

TRANSFER-TYPE PLASMA TORCH WITH RING-SHAPED CATHODE AND WITH PROCESSING GAS PASSAGE PROVIDE INTERIORLY OF THE CATHODE

Hiroshi Shiraishi; Nobuo Tajima; Tsuyoshi Shinoda, and Nobuyoshi Hirotsu, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Apr. 19, 1989, Ser. No. 340,188
Claims priority, application Japan, Apr. 26, 1988, 63-102992
Int. Cl.[5] B23K *9/00*
U.S. Cl. 219—121.5 **4 Claims**



1. A transfer-type plasma torch which has a cathode and an ignition anode and in which, after a trigger electric discharge has been produced between the cathode and the ignition anode, an electric discharge is effected between the cathode and an object to be treated that is set as the anode, said plasma torch comprising:

a cylindrical cathode-holding member having formed therein a space allowing for the flow of a coolant;

an ignition anode disposed within said cathode-holding member;

a ring-shaped cathode disposed on an inner periphery of said cathode-holding member and positioned below the tip of said ignition anode, with the tip portion of said cathode projecting downwardly from the bottom face of said cathode-holding member; and

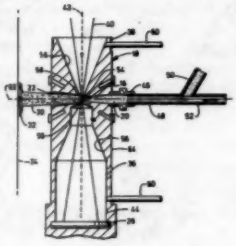
a gas flow passage defined by a space formed by an inner surface of said cathode-holding member and an outer surface of said ignition anode and along an inner surface of said ring-shaped cathode, said gas flow passage being the only gas flow passage, in the torch and said gas flow passage permitting introduction of a gas flow to said cathode, said gas flow passing along said inner surface of said cathode, such that said gas flow is introduced only interiorly of said cathode.

4,958,058

TRANSVERSE FLOW LASER SPRAY NOZZLE

Wilbur D. Scheidt; Eric J. Whitney, both of Cincinnati, and Vanon D. Pratt, Hamilton, all of Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Feb. 8, 1989, Ser. No. 307,794
Int. Cl.[5] B23K *26/00*
U.S. Cl. 219—121.6 **18 Claims**



1. Apparatus for producing a flow of a molten feed material, comprising:

a laser heating source having a beam directed into an interaction volume, the beam having an intensity within the interaction volume sufficient to melt the feed material when introduced into the interaction volume;

means for introducing the feed material into the interaction volume; and

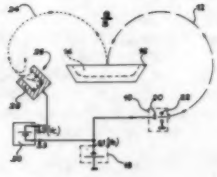
means for partially confining the molten feed material within the interaction volume and for ejecting the molten feed material from the interaction volume in a direction having a component transverse to the laser beam.

4,958,059

ELECTRONIC BOMBARDMENT EVAPORATOR EQUIPPED WITH MEANS TO RECOVER BACKSCATTERED ELECTRONS

Jean-Francois Lizee, Paris, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Jun. 30, 1989, Ser. No. 374,474
Claims priority, application France, Jul. 6, 1988, 88 09156
Int. Cl.[5] B23K *15/00*
U.S. Cl. 219—121.34 **3 Claims**



1. Electronic bombardment evaporator provided with means for recovering electrons backscattered by a target subjected to a bombardment by an electronic beam, said beam originating from an electron gun with an electrode connected to an output S1 of a first d.c. power source, said power source furnishing a negative potential Vo on its output S1, wherein it includes:

means to collect said backscattered electrons, said means being brought to a potential Vc so that the electrons backscattered by the target are attracted by said means,

a second d.c. power source connected via a first output S2 to

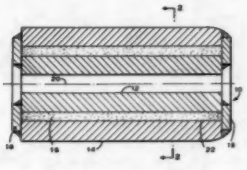
the means to collect the backscattered electrons, said first output being brought to the potential Vc, the second power source being also connected via a second output S3 to the output S1 of the first power source, the second output S3 being brought to the potential Vo.

4,958,060

CLAD METAL ELECTRODE

William L. Mankins, Huntington, W. Va.; David O. Gothard, Cary, N.C., and Charles P. Hardy, Kitts Hill, Ohio, assignors to Inco Alloys International, Inc., Huntington, W. Va.

Division of Ser. No. 172,772, Mar. 28, 1988, Pat. No. 4,933,141.
This application Jul. 12, 1989, Ser. No. 378,768
Int. Cl.[5] B23K *35/02*
U.S. Cl. 219—145.22 **3 Claims**



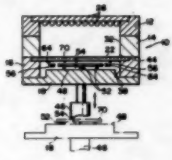
1. A clad welding electrode comprising a nickel tube, an iron rod within the nickel tube and consolidated nickel powder between the nickel tube and the iron rod bonding the nickel tube to the iron rod.

4,958,061

METHOD AND APPARATUS FOR HEAT-TREATING A SUBSTRATE

Tsuyoshi Wakabayashi, Kofu, and Shigehito Ibuka, Higashiyamato, both of Japan, assignors to Tokyo Electron Limited, Tokyo, Japan

Filed Jun. 27, 1989, Ser. No. 371,807
Claims priority, application Japan, Jun. 27, 1988, 63-156679
Int. Cl.[5] H01L *21/477*
U.S. Cl. 219—411 **10 Claims**



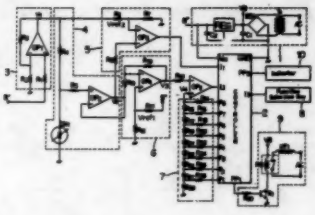
1. An apparatus for heat-treating a substrate, comprising:
a chamber for defining a closed space for receiving the substrate;
an infrared-ray lamp arranged inside said chamber;
a platen constituting part of said chamber;
moving means for moving said platen to close and open said chamber and for simultaneously causing the substrate to be respectively loaded into said chamber and unloaded from said chamber;
supporting means for supporting the substrate relative to said platen such that a space is defined between a reverse side of the substrate and a surface of said platen substantially opposite the reverse side of the substrate;
a ring-like temperature security member for preventing heat dissipation from the substrate, said ring-like temperature security member being disposed around the substrate with a narrow gap therebetween;
a quartz window plate located between said infrared-ray lamp and the substrate; and
pin means, attached to said quartz window plate, for supporting said temperature security member.

4,958,062

DRIVING CONTROL APPARATUS FOR AN ELECTRIC RANGE WITH SELF-DIAGNOSIS FUNCTION

Sang Soo Han, Kyunggi-Do, Rep. of Korea, assignor to Goldstar Instrument & Electric Co., Ltd., Seoul, Rep. of Korea

Filed Feb. 28, 1989, Ser. No. 317,189
Int. Cl.[5] H05B *1/02*
U.S. Cl. 219—497 **11 Claims**



1. A driving control apparatus for an electric range having an oven including a heating device and a self diagnosis function, comprising:
a constant voltage circuit producing a constant voltage as an output;
a sensor power supply coupled to said constant voltage circuit, receiving said constant voltage and producing a sensor power signal as an output;
a temperature detector coupled to said sensor power supply, receiving said sensor power signal and producing a temperature signal as an output in accordance with a temperature in the oven;
an over temperature detector, receiving said sensor power signal and said temperature signal, said over temperature detector comprising,
reference signal generator receiving said sensor power signal and producing a reference signal; and
a comparator receiving said reference signal and said temperature signal, said comparator producing an over temperature output signal having a value dependent upon an outcome of the comparison;
a comparison circuit receiving said temperature signal and said constant voltage wherein said comparison circuit comprises,
a second reference signal generator receiving said constant voltage and producing a second reference signal; and
a second comparator receiving said second reference signal and said temperature signal and producing a comparison output signal having a value dependent on the result of comparing said second reference signal and said temperature signal;
a function selection key circuit producing a function selection signal corresponding to a desired range function;
a controller, producing a digital step pulse signal;
a digital analog converter receiving said digital step pulse and producing a corresponding analog signal;
a second comparison circuit receiving said comparison output signal said corresponding analog signal and producing a second comparison output signal and said corresponding analog signal and producing a second comparison output signal corresponding to a result of the comparison done by said second comparison circuit;
said controller receives said second comparison output sig-

nal and said function selection signal and produces a power control signal and a function indication signal, said power control signal having a value dependent on said second comparison output signal, said function indication signal having a value dependent on said function selection signal;

a heater driving circuit producing a heater driving signal to control the heating device in response to said power control signal; and

an indicator indicating a selected range function in response to said function indication signal.

4,958,063

DEVICE FOR COUNTING OBJECTS

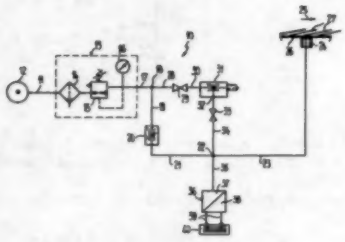
Peter Hausmann, Bäretswil, Switzerland, assignor to Ferag AG, Hinwil, Switzerland

Filed Jun. 26, 1989, Ser. No. 371,393

Claims priority, application Switzerland, Jun. 29, 1988, 02476/88

Int. Cl.[5] G06M *1/12*

U.S. Cl. 235—201 FS **7 Claims**



1. An apparatus for counting articles being conveyed along a path of travel, and comprising

air delivery line means (21,34),

means for delivering air through said air delivery line means,

a ring-jet sensor (24) mounted adjacent said path of travel and having an outlet directed toward the conveyed articles, and with said sensor being coupled to a first branch line (23),

pressure sensor means (36) coupled to a second branch line (35) for sensing and counting pressure changes in said second branch line, and with said first and second branch lines being coupled in parallel to said air delivery line means, and

whereby pressure changes are induced in said air delivery line means by an article being conveyed past said ring-jet sensor and such pressure changes are adapted to be sensed and counted by said pressure sensor means.

4,958,064

BAR CODE LOCATOR FOR VIDEO SCANNER/READER SYSTEM

Robert D. Kirkpatrick, Farmers Branch, Tex., assignor to Image Recognition Equipment Corporation, Richardson, Tex.

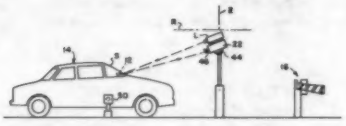
Filed Jan. 30, 1989, Ser. No. 302,012

Int. Cl.[5] G07B *15/02*

U.S. Cl. 235—384 **12 Claims**

1. In a reader/scanner system for automatically reading bar code data elements displayed on a carrier, the improvement comprising:

a uniquely configured target locator including a group of locator elements having predetermined and known characteristics disposed on said carrier in association with said bar code data elements, said target group including a set of serially spaced rectangles superimposed on a high contrast background, said rectangles when intersected by a line through the center of said target group defining a sequence of contrasting bars and spaces, said bars and spaces having predetermined widths along said centerline; and,



means responsive to the respective width ratios of said locator elements and spaces for initially detecting the presence of said target locator group and thereafter reading the bar code data elements adjacent to said target locator group.

4,958,065

METHOD AND APPARATUS FOR CODING HEAT SENSITIVE MEDIA

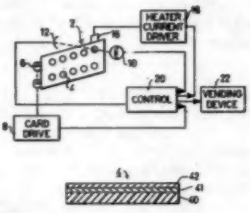
Zvi Weinberger, Jerusalem, Israel, assignor to Prepaid Card Services, Inc., Pearl River, N.Y.

Continuation of Ser. No. 773,801, Sep. 9, 1985, abandoned. This application Aug. 1, 1988, Ser. No. 227,468

Claims priority, application Israel, Sep. 14, 1984, 72951

Int. Cl.[5] G06K *7/10*

U.S. Cl. 235—455 **24 Claims**



1. A method of coding an optically-readable medium comprising:

applying to the medium at least one coating of a heat-sensitive material to produce a specified combination of at least two optical changes as a function of time when heated to a predetermined temperature above ambient;

heating said medium to said predetermined temperature;

and sensing the optical changes undergone by the medium to determine whether the sensed changes match said specified combination.

4,958,066

FINANCIAL INSTRUMENT VERIFICATION AND METHOD OF PRODUCTION

Virgle L. Hedgcoth, Pomona, Calif., assignor to Secured Transactions, Pomona, Calif.

Filed Aug. 19, 1988, Ser. No. 234,394

Int. Cl.[5] G06K *19/00*

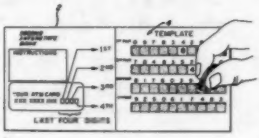
U.S. Cl. 235—487 **28 Claims**

1. A verification system for use at a transactional point comprising:

means for providing a dedicated ascertainable code unique to the entity involved in the transaction;

a transactional instrument having subjectively coded symbols that are obscured from view in a matrix array with

subjectively coded visible addresses to the matrix array, and



means for selecting predetermined addresses for identifying the coded symbols for comparison with the dedicated ascertainable code to verify the transaction.

4,958,067

METHOD AND APPARATUS FOR OPTICALLY DETECTING THE LOCATION OF A CONTROL OBJECT IN A CONTROL PANEL RECESS

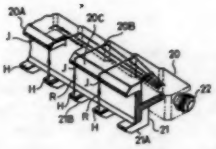
Yoshiyuki Nakatomi; Toshirou Iwasa, and Hitoshi Kobayashi, all of Iwaki, Japan, assignors to Alpine Electronics Inc., Tokyo, Japan

Filed Dec. 6, 1988, Ser. No. 280,766

Claims priority, application Japan, Jan. 25, 1988, 63-7784; May 18, 1988, 63-65466

Int. Cl.[5] G01V 9/04

U.S. Cl. 250—221 **16 Claims**



1. An apparatus for optically detecting the location of a control object applied to a control panel, comprising:

a recess formed on said control panel for receiving said control object;

a plurality of light receiving portions formed on a first inside surface of said recess and arranged in a longitudinal direction of said recess;

a plurality of light emitting portions formed on a second inside surface of said recess opposed to said first inside surface, each light emitting portion located opposite a corresponding one of each of the light receiving portions so as to emit light to the opposite light receiving portion, whereby a plurality of light paths pass from said light emitting portions across said recess to said light receiving portions, said light paths being arranged in the longitudinal direction of said recess;

a light generator for supplying the light to each light emitting portion;

a detector connected to said light receiving portions for generating a signal in response to the light emitted from said light emitting portions and received by said light receiving portions; and

a light transmitting member connected to said light receiving portions, said light transmitting member having a back surface with a plurality of stepped portions corresponding to said light receiving portions, wherein the light received by said light receiving portions is reflected by said stepped portions and is transmitted through said light transmitting member to said detector.

4,958,068

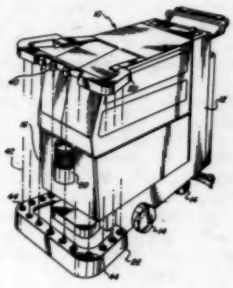
DUAL BUMPER-LIGHT CURTAIN OBSTACLE DETECTION SENSOR

William Pong, Brookfield Center; Robert G. Stacy, and Allen J. Bancroft, both of Danbury, all of Conn., assignors to Transitions Research Corporation, Danbury, Conn.

Continuation-in-part of Ser. No. 265,784, Nov. 1, 1988, and Ser. No. 307,765, Feb. 7, 1989. This application Jul. 28, 1989, Ser. No. 387,151

Int. Cl.[5] G01V 9/04

U.S. Cl. 250—222.1 **17 Claims**



1. Obstacle detection system for an autonomous mobile vehicle comprising:

a first bumper disposed laterally across the frontal cross section of the vehicle;

a second bumper, spaced from the first bumper, and disposed laterally across the frontal cross section of the vehicle; and

an array of light sources disposed on the vehicle for emitting a curtain of light beams between the first and second bumpers;

an array of light receivers disposed on the vehicle for receiving the light beams, said light receivers providing an indication of the position of an object intruding between the first and second bumpers towards the vehicle.

4,958,069

APPARATUS FOR DETECTING PRESENCE OR ABSENCE OF RECORDING MEDIUM IN PRINTER

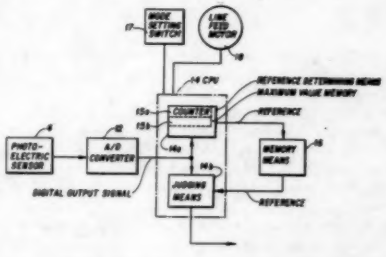
Shuhei Okamori, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Jun. 19, 1989, Ser. No. 367,959

Claims priority, application Japan, Jun. 22, 1988, 63-154056

Int. Cl.[5] G01N 9/04

U.S. Cl. 250—223 R **7 Claims**



1. An apparatus for detecting the presence or absence of a recording medium in a printer in which the recording medium is fed along a feeding path, the apparatus comprising:

a rotary support member for supporting the recording me-

dium, said support member having a surface whose reflectance of light is lower than that of the recording medium;

a photo-electric sensor disposed adjacent to a predetermined position on the surface of said support member which partially defines the feeding path of the printer, said photo-electric sensor including a light emitting element which emits light toward said surface of the support member, and a light receiving element which receives the light reflected from said surface and which generates an output signal corresponding to an intensity of the received light;

reference determining means for determining a reference based on a maximum value of said output signal which is generated by said light receiving element of said photo-electric sensor during rotation of said rotary support member by at least one turn in a reference setting mode in which the recording medium is absent at said predetermined position, said reference determining means determining said reference by adding an extra value to said maximum value of said output signal;

memory means for storing said reference determined by said reference determining means; and

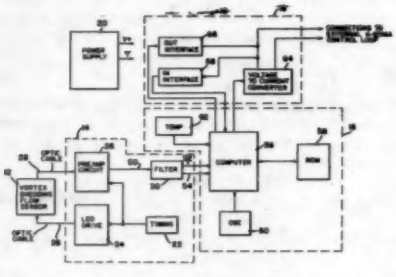
judging means for comparing the output signal of said photo-electric sensor with said reference in a normal operation mode, and for judging that the recording medium is present at said predetermined position if the output signal in said normal operation mode is higher than said reference.

4,958,070

DIGITAL ELECTRONICS FOR CONTROLLING A FIBER OPTIC SHEDDING FLOWMETER

David W. Jordan, Euclid, and William L. Thompson, Montville, both of Ohio, assignors to The Babcock & Wilcox Company, New Orleans, La.

Filed Nov. 7, 1988, Ser. No. 267,896
Int. Cl.[5] H01J *40/14*
U.S. Cl. 250—227.21 **5 Claims**



1. A digital electronics system for controlling a fiber optic vortex shedding flowmeter, comprising:

light emitting means;

light detecting means;

light connecting means connected to said light emitting means and said light detecting means for varying the attenuation of light from said light emitting means to said light detecting means according to a variable to be measured;

means for generating an electrical signal proportional to said varied attenuation of light, said generating means having a feedback circuit which eliminates an average peak value of said light attenuation to generate said electrical signal proportional to the modulation of said light signal;

filter circuit means for dividing said electrical signal into at least two output signals with said output signals being offset in time, said filter circuit means having means for comparing each output signal with a predetermined reference level for eliminating signal noise;

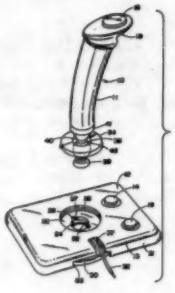
and computer means in communication with said output signals for determining the measured variable therefrom and for correcting the measured variable according to process variables.

4,958,071

A JOYSTICK INCLUDING AN OPTICAL ENCODER WITH FILM STRIPS IN SLIDING CONTACT

Dennis Scott-Jackson, and Harry Skibbe, both of Burnaby, Canada, assignors to Advanced Gravis Computer Technology, Ltd., Burnaby, Canada

Filed Jan. 13, 1989, Ser. No. 296,784
Int. Cl.[5] G01D *5/34*; G01V *9/04*
U.S. Cl. 250—229 **21 Claims**



16. A joystick, comprising:

(a) a casing;

(b) a lever pivotally coupled to said casing and pivotal about a point along the length thereof;

(c) a pair of optical encoders coupled to said lever so as to respond to a component of pivotal movement of said lever in each of two orthogonal planes with a first one of said pair providing a number of output pulses proportional to an angle of pivoting in one of said planes and a second one of said pair a number of output pulses proportional to an angle of pivoting in another of said planes wherein each encoder includes:

(d) a base;

(e) a rotor rotatably attached to said base and coupled to said lever;

(f) a pair of window chambers affixed to said base;

(d) a reticle mounted on said base in a cylindrically disposed position traversing each of said window chambers and having alternating transparent and opaque areas;

(b) a moving unit mounted on said rotor, cylindrically disposed to, concentric with and juxtaposed to said reticle having alternating transparent and opaque areas substantially matching those of said reticle but spaced such that alternating opaque and transparent regions of said moving unit and said reticle come into and out of alignment and such that as said moving unit is moved past said reticle, a periodic variation of light transmitted through said reticle and moving unit results with the transparent regions of said moving unit becoming fully aligned with those of said reticle in one of said windows and 90 degrees out of full alignment in another of said windows;

(c) light emitting means in each of said chambers for directing light onto said reticle and moving unit; and

(d) light sensing means in said window chambers for detecting light from a corresponding one of said light emitting means after its transmission through said reticle and moving unit;

wherein each of said reticle and moving unit are photographic

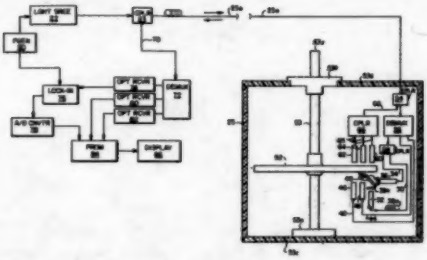
film strips with alternating exposed and unexposed bands transverse to the length of the strips corresponding to said opaque and transparent regions, respectively, wherein the bands on one of said film strips being of equal dimensions and equispaced and having the same dimensions and spacing as those on another of said film strips and said film strips are in sliding contact with one another so that reflections from surfaces of the film strips due to air gaps between the strips is substantially reduced.

4,958,072

REMOTE FIBER OPTIC ANGULAR-ORIENTATION SENSOR USING PHASE DETECTION OF TWO ORTHOGONAL OSCILLATING POLARIZATION VECTORS

Thomas Hofler, Monterey; Michael R. Brininstool, San Diego, both of Calif.; Jeffrey T. Newmaster, Portsmouth, R.I., and Steven L. Garrett, Pebble Beach, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 7, 1988, Ser. No. 241,534
Int. Cl.[5] G01C *17/26*; G02F *1/01*
U.S. Cl. 250—231.13 **26 Claims**



1. A sensor for remotely detecting an angular position of a rotatable code wheel comprising:

first means for generating first and second modulated polarized light beams each having a first center wavelength, said first light beam being polarized orthogonally to said second sight beam, said first light beam having a phase lag with respect to said second light beam, and for combining said first and second light beams into a composite polarized light beam;

second means positioned proximate to said first means for receiving said composite polarized light beam;

a code wheel rotatable about an axis, said code wheel having a first polarization filter, said code wheel interposed between said first means and said second means so that said composite polarized light beam is transmitted through said polarization filter; and

third means operably connected to said second means for providing an output corresponding to said angular position of said code wheel by comparing a phase relationship between said composite polarized light beam and a reference signal.

4,958,073

APPARATUS FOR FINE SPATIAL RESOLUTION MEASURMENTS OF EARTH FORMATIONS

Arthur J. Becker, Ridgefield, Conn.; Joel L. Groves, Leonia, N.J., and Charles C. Watson, Danbury, Conn., assignors to Schlumberger Technology Corporation, New York, N.Y.

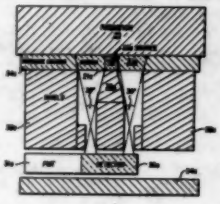
Filed Dec. 8, 1988, Ser. No. 281,577
Int. Cl.[5] G01V *5/04, 5/12*
U.S. Cl. 250—269 **36 Claims**

1. An apparatus for obtaining indications of at least one characteristic of an earth formation traversed by a borehole, comprising:

(a) a source means for irradiating said formation with photons capable of Compton scattering in said formation; and

(b) a detector means for detecting photons Compton scattered by said formation,

said source means positioned at a first location on said apparatus and arranged such that photons from said source means enter said formation, and said detector means positioned at a second location on said apparatus and arranged such that photons having Compton scattered enter said apparatus for detection by said detector means, wherein said first and second locations are in such close proximity and said source and detector means are so arranged such that said detector provides a non-negative response to an increase of density in said earth formation for densities and Pe factors typical of earth formations.

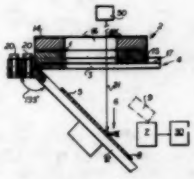


4,958,074

APPARATUS AND METHOD FOR INSPECTING A MASK

Edward Wolf, Ithaca, N.Y.; Ernst Hammel, and Christian Truher, both of Vienna, Austria, assignors to Oesterreichische Investitionskredit Aktiengesellschaft and Ims Ionen Mikrofabrikations Systeme Gesellschaft M.B.H., both of Vienna, Austria

Filed Jul. 13, 1988, Ser. No. 218,822
Claims priority, application Austria, Jul. 13, 1987, 1766187
Int. Cl.[5] H01J *37/26*
U.S. Cl. 250—309 **23 Claims**



1. An apparatus for inspecting masks for X-ray or corpuscular beam lithography, wherein the X-ray lithography masks are provided with a pattern of X-ray opaque regions and the corpuscular beam lithography masks are provided with a pattern of apertures, comprising

a stage for supporting said mask to be inspected disposed in the path of a corpuscular inspection beam projected from a beam source arranged above said stage, said stage including a stage aperture also disposed in said beam path and being movable through a series of positions to expose said pattern progressively to said beam;

an emitter surface for emitting secondary radiation disposed in said beam path below said stage aperture, said secondary radiation resulting from the impingement of said inspection beam transmitted through said mask onto said emitter surface;

a detector disposed to generate signals corresponding to said secondary radiation; and

an image storage device for receiving and storing the signals generated by said detector.

4,958,075

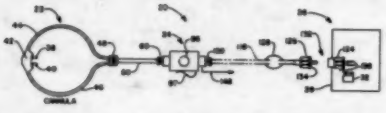
GAS ANALYZER

Leslie E. Mace, Mercer Island; Daniel W. Knodle, Seattle; Lawrence L. Labuda, Issaquah, all of Wash., and Philip F. Nuzzo, Wallingford, Conn., assignors to NTC Technology Inc., Wilmington, Del.

Continuation of Ser. No. 107,267, Oct. 9, 1987, abandoned. This application Dec. 14, 1989, Ser. No. 453,227

Int. Cl.[5] A61B *5/097*; **G01N** *21/05, 21/61*

U.S. Cl. 250—343 **16 Claims**



1. A system for effecting and monitoring the flow of a gas mixture through a gas analyzer sampling device comprising: a first line for connecting the input of the sampling device to the source of the gases being monitored, pump means, a second line for connecting the output of the sampling device to said pump means, and first and second complementary control means mounted on said sampling unit and operatively connected to said pump means which is operable to keep said pump means from being turned on unless a sampling unit having said first control means is connected to said pump means.

4,958,076

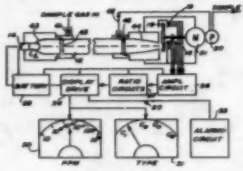
SELECTIVE NATURAL GAS DETECTING APPARATUS

Ulrich Bonne, Hopkins, and Robert J. Matthys, Minneapolis, both of Minn., assignors to Gas Research Institute, Chicago, Ill.

Filed Feb. 10, 1989, Ser. No. 308,469

Int. Cl.[5] G01N *21/61*

U.S. Cl. 250—343 **19 Claims**



1. A selective gas detecting apparatus for determining a concentration and type or average type of hydrocarbon gas in a gas sample based upon absorption of infrared radiation by the gas sample, comprising: sampling means for passing infrared radiation through the gas sample, infrared radiation detecting means for detecting infrared radiation passed through the gas sample and producing in a first signal channel a first measurement signal indicative of a first wavelength absorbed by the gas sample, and producing in a second signal channel a second measurement signal indicative of a second wavelength absorbed by the gas sample, processing circuit means including first circuit means responsive to said first measurement signal for providing a first output signal corresponding to an indication of a first total concentration of hydrocarbons in the gas sample, second circuit means responsive to said second measurement signal for providing a second output signal corresponding to an indication of a second total concentration of hydrocarbons in the gas sample, first function generating circuit means for receiving said first output signal and providing a first absorbance signal corresponding to a natural logarithm of said first output signal and indicative of absorbance by said gas sample of infrared radiation at said first wavelength, second function generating circuit means for receiving said second output signal and providing a second absorbance signal corresponding to the natural logarithm of said second output signal and indicative of absorbance by the gas sample of infrared radiation at said second wavelength, ratio determining means responsive to said first and second absorbance signals for providing a ratio signal corresponding to the ratio of said first and second absorbance signals, said ratio signal being indicative of the type or average type of hydrocarbon in the gas sample, and display means responsive to said first absorbance signal and said ratio signal for providing and indication of the concentration and type or average type of hydrocarbon gas in the gas sample, respectively.

4,958,077

METHOD AND APPARATUS FOR DISPLAYING MOVING OBJECTS

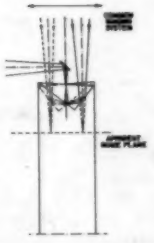
Josef F. Menke, Foerdestrasse 27, D-2392 Gluecksburg, Fed. Rep. of Germany

Filed Aug. 31, 1988, Ser. No. 238,734

Claims priority, application Fed. Rep. of Germany, Aug. 31, 1987, 3729059

Int. Cl.[5] G01J *5/14*

U.S. Cl. 250—347 **4 Claims**



1. A method for displaying moving objects comprising:

(a) conducting a line scan of an object with a prismatic rotating wheel, the prismatic rotating wheel periphery including a plurality of adjacent, recessed, and oppositely reflecting triplet mirror surfaces;

(b) said prismatic rotating wheel oppositely reflecting triplet mirror surfaces alternately deflecting a first signature scan and a second signature scan of said object with a minimum mutual time shift in first and second directions respectively, onto a single detector;

(c) time delaying said first signature scan by an intermediate storage so that it is simultaneously available with said second signature scan;

(d) determining the difference of said signature scans; and,

(e) defining the remaining uncancelled individual signals in said storage as coordinates of said object and presenting these coordinates in electronic form as output signals for defining position coordinates of said object.

4,958,078

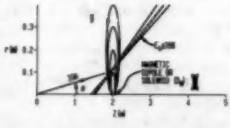
LARGE APERTURE ION-OPTICAL LENS SYSTEM

Fred D. Becchetti, Ann Arbor, Mich., assignor to The University of Michigan, Ann Arbor, Mich.

Filed Jan. 5, 1989, Ser. No. 293,694

Int. Cl.[5] H01J *37/10*

U.S. Cl. 250—396 R **14 Claims**



1. A lens system for an energy beam, the lens system comprising:

focusing means for receiving the energy beam and focusing

same toward an axis which extends through said focusing means and which defines a general direction of propagation of the energy beam; and

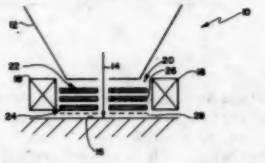
defocusing means having an exterior and an interior, and arranged in a predetermined axial relationship with respect to said focusing means, the energy beam being propagated along a path which substantially surrounds said exterior of said defocusing means, for defocusing the energy beam away from said axis.

4,958,079

DETECTOR FOR SCANNING ELECTRON MICROSCOPY APPARATUS

John W. Gray, Ware, Mass., assignor to Galileo Electro-Optics Corps., Sturbridge, Mass.

Filed Feb. 21, 1989, Ser. No. 313,022
Int. Cl.[5] H01J *37/244*
U.S. Cl. 250—397 **8 Claims**



1. Scanning electron microscopy apparatus employing a detector to detect emission of electrons resulting from the impingement of electrons of an electron beam on an object being viewed, said apparatus comprising

an electron beam source providing said electron beam,

a magnet providing a magnetic field to direct said electron beam to said object,

a first microchannel plate having a first hole through it aligned with said electron beam, a first surface directed toward said electron beam source, said first surface being biased for receiving low energy electrons that have been emitted from said object and directed through said hole by said magnetic field, and a second surface on the opposite side of said first microchannel plate that is biased for discharge of multiplied electrons, and

a first anode facing said second surface, said first anode being positioned to collect electrons discharged from said second surface.

4,958,080

LUTETIUM ORTHOSILICATE SINGLE CRYSTAL SCINTILLATOR DETECTOR

Charles L. Melcher, West Redding, Conn., assignor to Schlumberger Technology Corporation, New York, N.Y.

Continuation of Ser. No. 254,353, Oct. 6, 1988, abandoned. This application Aug. 4, 1989, Ser. No. 389,502
Int. Cl.[5] C09K *11/79*; G01J *1/58*
U.S. Cl. 250—483.1 **2 Claims**

1. A gamma ray or x-ray detector, comprising: a scintillator composed of a transparent single crystal of cerium-activated lutetium oxyorthosilicate having the general formulation $Ce_{2x}Lu_{2(1-x)}SiO_5$, where x is within the range of from approximately 2×10^{-4} to approximately 3×10^{-2}, and

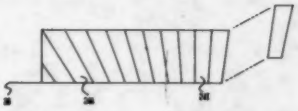
a photodetector optically coupled to the scintillator for producing an electrical signal in response to the emission of a light pulse by the scintillator.

4,958,081

FOCUSING COLLIMATOR AND METHOD FOR MAKING IT

Ronald E. Malmin, Chicago, and William R. Guth, Hoffman Estates, both of Ill., assignors to Siemens Gammasonics, Inc., Hoffman Estates, Ill.

Filed Aug. 14, 1985, Ser. No. 765,611
Int. Cl.[5] G21K *1/02*
U.S. Cl. 250—505.1 **2 Claims**



1. A method of manufacturing a focusing corrugated strip type collimator in which all focii lie in a single central stacking plane which is perpendicular to all of the strips, comprising

procuring a plurality of corrugated strips which are shaped in cross-section within said central stacking plane as different parts of different radial sectors of a common predetermined annulus;

stacking the strips on a flat surface; and

bonding the strips together.

4,958,082

POSITION MEASURING APPARATUS

Susumu Makinouchi, and Toshikazu Umatate, both of Kawasaki, Japan, assignors to Nikon Corporation, Tokyo, Japan

Filed Aug. 25, 1988, Ser. No. 236,206
Claims priority, application Japan, Aug. 31, 1987, 62-217261
Int. Cl.[5] G01N *21/86*
U.S. Cl. 250—548 **18 Claims**

1. An exposure apparatus for exposing a pattern on a substrate to be exposed having a predetermined mark formed thereon, including

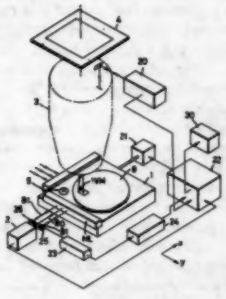
a) stage means for supporting said substrate to be exposed thereon;

b) moving means capable of moving said stage means in a direction along a predetermined surface;

c) mark detecting means for applying a light beam to said substrate to be exposed and detecting said predetermined mark;

d) position detecting means for outputting a position signal conforming to the position of said stage means on said predetermined surface;

e) producing means for detecting information regarding rotation of said stage means along said predetermined surface and producing an information signal; and



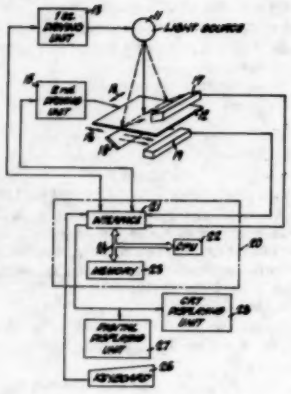
f) correcting means for correcting on the basis of said information signal said position signal when said mark detecting means detects said predetermined mark.

4,958,083

INSPECTING APPARATUS CAPABLE OF ACCURATELY INSPECTING AN OBJECT

Nagahiro Sakamoto, Yamanashi, Japan, assignor to Hoya Corporation, Naka-Ochiai, Japan

Filed Dec. 27, 1988, Ser. No. 290,037
Claims priority, application Japan, Dec. 29, 1987, 62-333952
Int. Cl.[5] G01N *21/88*
U.S. Cl. 250—572 8 Claims



1. An apparatus for inspecting whether or not a defect is present on an object, by the use of an inspecting beam which is partially reflected as a partial reflected light beam on said object and which is partially transmitted as a partial transmitted light beam through said object, said defect being classifiable as a pinhole defect or a particle defect, said partial transmitted light beam being subjected to an undesirable influence by said particle defect depending upon the size of said particle defect, said undesirable influence appearing as an overshoot of said partial transmitted light beam, said apparatus comprising:

first detecting means for detecting said partial reflected light beam to produce a first detection signal which is dependent on said partial reflected light beam;

second detecting means for detecting said partial transmitted light beam to produce a second detection signal which is dependent on said partial transmitted light beam; and

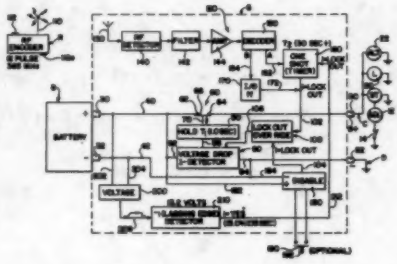
processing means coupled to said first and said second detecting means for processing said first and said second detection signals to detect whether or not said overshoot of the partial transmitted light beam appears on the basis of said first and said second detection signals and thereby to inspect occurrence of said defect on said object.

4,958,084

SELF-CONTAINED ANTI-THEFT DEVICE FOR MOTOR VEHICLES

Louis D. Carlo, Cleveland, and Joey B. Adkins, Northfield, both of Ohio, assignors to Mr. Gasket Co., Cleveland, Ohio

Filed Dec. 23, 1983, Ser. No. 564,702
Int. Cl.[5] B60R *25/04*
U.S. Cl. 307—10.2 60 Claims



1. An anti-theft device adapted to be connected adjacent a battery of a motor vehicle having a starting circuit including an operating switch and a starting motor adapted to draw a substantial amount of current from said battery when said operating switch is actuated, said anti-theft device comprising:

(a) a power switching device having a first condition connecting said battery to said starting circuit and a second condition disconnecting said starting circuit from said battery;

(b) current detecting means for detecting the flow of said substantial amount of current from said battery;

(c) operating means for shifting said power switching device into said second condition when said detecting means detects said substantial amount of current flow; and,

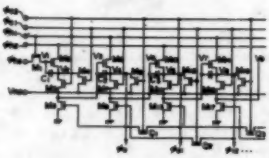
(d) lockout means for creating a signal to override said operating means upon receipt of an external command signal with a given code.

4,958,085

SCANNING CIRCUIT OUTPUTTING SCANNING PULSE SIGNALS OF TWO OR MORE PHASES

Seiji Hashimoto, Yokohama, and Hayao Ohzu, Fuchu, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 24, 1988, Ser. No. 261,264
Claims priority, application Japan, Oct. 30, 1987, 62-273185; Nov. 6, 1987, 62-279389
Int. Cl.[5] H03K *5/00*; G01R *19/145*
U.S. Cl. 307—262 5 Claims



1. A scanning circuit composed of unit circuits connected in plural stages, for outputting scanning pulse signals of at least two phase in succession from said unit circuits according to first multi-phase driving pulse signals, said scanning circuit comprising:

setting means for setting said unit circuits in a reset state; and

switch means for activating said setting means of a preceding unit circuit by a respective one of the scanning pulse signals;

wherein said switch means are operated by second driving pulse signals different from the first multi-phase driving pulse signals.

4,958,086

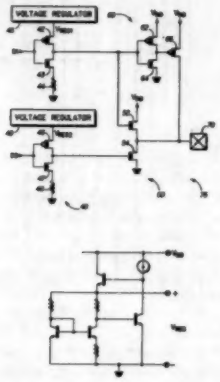
LOW DI/DT OUTPUT BUFFER WITH IMPROVED SPEED

Karl L. Wang, and Taisheng Feng, both of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed May 8, 1989, Ser. No. 348,357

Int. Cl.[5] H03K *4/94, 17/16*

U.S. Cl. 307—296.8 **11 Claims**



1. In an integrated circuit, an output buffer for providing an outut signal to said integrated circuit, comprising:

voltage regulator means, coupled to a first power supply voltage terminal and a second power supply voltage terminal, for providing a regulated voltage signal characterized as having a constant voltage substantially independent of fluctuations between the first power supply voltage terminal and the second power supply voltage terminal;

a predrive, said predriver having a positive power supply input terminal and a negative power supply input terminal, wherein said positive power supply terminal is coupled to the regulated voltage signal, and said negative power supply terminal is coupled to the second power supply voltage terminal, said predriver providing a regulated predriven signal in response to an input signal; and

an output stage couple to said first power supply voltage terminal and to said second power supply voltage terminal, said output stage receiving the regulated predriven signal and providing said output signal in response thereto.

4,958,087

ARRANGEMENT FOR AND METHOD OF DOUBLING THE FREQUENCY OF A LIGHT WAVE

Egbert W. Meijer; Edsko E. Havinga, and Gerardus L. J. A. Rikken, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

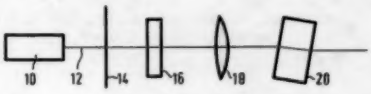
Filed Sep. 5, 1989, Ser. No. 403,220

Claims priority, application Netherlands, Feb. 10, 1989, 8900325

Int. Cl.[5] G02F *1/37*

U.S. Cl. 307—;425 **11 Claims**

1. An arrangement for doubling the frequency of a light wave, in which a fundamental light wave is passed through a non-linear optical medium, a second harmonic wave then being formed, characterized in that the arrangement includes means for circularly polarising the fundamental light wave and



that the non-linear optical medium is formed from a monocrystalline centrosymmetrical material whose molecules or molecular group evidence chirality.

4,958,088

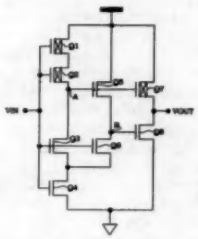
LOW POWER THREE-STAGE CMOS INPUT BUFFER WITH CONTROLLED SWITCHING

Mohammad H. Farah-Bakhsh, and Stephen L. Casper, both of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.

Filed Jun. 19, 1989, Ser. No. 368,405

Int. Cl.[5] H03K *17/687*

U.S. Cl. 307—443 **6 Claims**



1. A buffer, comprising:

(a) an output;

(b) an output stage which includes a pulldown device and a pullup device coupled to the output, wherein the pullup device is deactivated before said pulldown device is activated;

(c) an input stage, comprising a first transistor of a first conductivity type, and a second transistor of a second conductivity type, said transistors gated by an input node, a first terminal of said first transistor responsive to a supply potential, a second terminal of said first transistor and a first terminal of said second transistor connected to a first node, a second terminal of said second transistor responsive to a reference potential;

(d) a middle stage, comprising third and fourth transistors of said second conductivity type, said third transistor gated by said first node, said fourth transistor gated by said input node, a first terminal of said third transistor responsive to said supply potential, a second terminal of said third transistor and a first terminal of said fourth transistor connected to a second node, a second terminal of said fourth transistor responsive to said reference potential; and

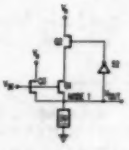
(e) said output stage comprising a fifth transistor of said first conductivity type and a sixth transistor of said second conductivity type, said fifth transistor gated by said first node, said sixth transistor gated by said second node, a first terminal of said fifth transistor responsive to said supply potential, a second terminal of said fifth transistor and a first terminal of said sixth transistor connected to an output node, a second terminal of said sixth transistor responsive to said reference potential.

4,958,089

HIGH OUTPUT DRIVE FET BUFFER FOR PROVIDING HIGH INITIAL CURRENT TO A SUBSEQUENT STAGE

Mark F. Fitzpatrick, San Jose, and Gary R. Gouldsberry, Cupertino, both of Calif., assignors to Gazelle Microcircuits, Inc., Santa Clara, Calif.

Filed Dec. 20, 1988, Ser. No. 287,320
Int. Cl.[5] H03K 19/017
U.S. Cl. 307—448 27 Claims



1. A buffer comprising:

a first transistor having a control terminal connected to receive an input signal, said first transistor having second and third terminals;

a second transistor having a third terminal coupled to said second terminal of said first transistor and a second terminal coupled to receive a first voltage;

a load device having a first terminal coupled to said third terminal of said first transistor and a second terminal coupled to a second voltage; and

a first inverter means coupled between said first terminal of said load device and a control terminal of said second transistor, said first terminal of said load device also for providing a first output signal,

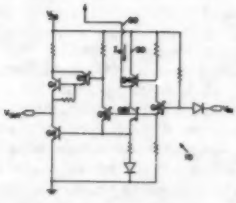
said first transistor and said second transistor being of the same conductivity type so as to exhibit complementary logical conducting states after said first inverter means has inverted a signal applied to said first terminal of said load device and applied an inverted signal to said control terminal of said second transistor.

4,958,090

NON-CURRENT HOGGING DUAL PHASE SPLITTER TTL CIRCUIT

Lars G. Jansson, Long Island, Me., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Mar. 6, 1989, Ser. No. 320,281
Int. Cl.[5] H03K 3/286, 19/003, 19/088
U.S. Cl. 307—456 25 Claims



1. A TTL circuit having dual transistor elements with respective base and emitter nodes coupled in current mirror configuration, said dual transistor elements having separately coupled collector nodes coupled respectively to separate collector current sources, comprising:

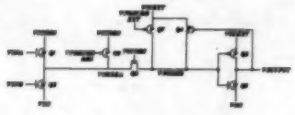
a low impedance current sourcing active transistor element operatively coupled in emitter follower configuration in parallel with one of the collector current sources at a collector node of one of the dual transistor elements, said emitter follower configuration active transistor element supplying compensating collector current for mirroring of the currents at the respective emitter nodes of the dual transistor elements substantially without base drive current hogging between the dual transistor elements.

4,958,091

CMOS VOLTAGE CONVERTER

Gregory N. Roberts, Boise, Id., assignor to Micron Technology, Inc., Boise, Id.

Filed Jun. 6, 1988, Ser. No. 202,962
Int. Cl.[5] H03K 19/20, 17/687
U.S. Cl. 307—451 8 Claims



1. In a circuit which provides a logic signal in high and low states, in which the low logic signal state approximates a common potential and the high state approximates a first high potential, an output circuit which provides high and low output signals for responding to said high and low logic signal states, with the low output signal approximating common potential and the high output signal approximating a second high potential, in which the difference between the potentials of the high and low output signals of the output circuit is greater than the difference in potentials between the high and low logic signal states, the circuit further comprising:

(a) a first inverter providing a first inverted output of the logic signal at a range of potentials approximating the high and low signals of the logic circuit, the first inverter circuit having power connections between a common potential and a regulated potential, the regulated potential approximating the first high potential;

(b) a second inverter having power connections between the common potential and external potential corresponding to the second high potential;

(c) an isolating transistor connecting the first and second inverters;

(d) means to conduct a high biasing potential to the second inverter in response to a low output of the second inverter, wherein a low level output of the first inverter initiates a low level signal provided through the isolating transistor to the second inverter and a high level output of the first inverter initiates a high level signal to the second inverter;

(e) the isolating transistor being biased to isolate the high level output of the first inverter from the second inverter after said initiation;

(f) a precharge signal generator responsive to a clocking signal and providing a predetermined biasing potential during a clock inactive signal;

(g) the isolating transistor being connected to gate current from an output of the first inverter to the input of the second inverter;

(h) the means to conduct the high biasing potential being an inverting transistor which is gated on by the low output of the second inverter and which gates current at a predetermined biasing potential to an input of the second inverter;

(i) a circuit responsive to the clocking signal to conduct the regulating potential to an output of the first inverter during the clock inactive cycle; and

(j) a precharge biasing circuit, responsive to the predetermined biasing potential to gate the second high potential to the input to the second inverter during the clock inactive cycle of the clock in order to bias the input of the

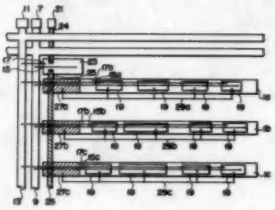
second inverter to a predetermined level prior to the gating on by the isolating transistor.

4,958,092

INTEGRATED CIRCUIT DEVICE HAVING ROW STRUCTURE WITH CLOCK DRIVER AT END OF EACH ROW

Shigeru Tanaka, Fujisawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 28, 1989, Ser. No. 329,908
Claims priority, application Japan, Mar. 29, 1988, 63-73285
Int. Cl.[5] H03K *3/26, 19/02;* **G06F** *15/606*
U.S. Cl. 307—480 **4 Claims**



1. An integrated circuit device comprising:

a primary power supply wiring connected to a power supply;

a primary ground wiring connected to a ground terminal, for holding a reference potential;

primary clock driver means, for receiving a clock signal from a clock signal input terminal;

a first clock signal input wiring for connecting said clock signal input terminal to said primary clock driver means;

a first row including a first secondary clock driver arranged at one end of said first row to be adjacent to a primary power supply wiring and a primary ground wiring, said first secondary clock driver having a clock signal input terminal connected to said primary clock driver means, a power supply terminal connected to said primary power supply wiring, and a ground terminal connected to said primary ground wiring, and a first group of a plurality of logic elements, which switch synchronously with the input clock signal, each having a power supply terminal and a ground terminal respectively connected to said primary power supply wiring and said primary ground wiring;

a first secondary power supply wiring for connecting said primary power supply wiring to said power supply terminal of said first secondary clock driver in said first row, and to said power supply terminals of said first group of logic elements;

a first secondary ground wiring for connecting said primary ground wiring to said ground terminal of said first secondary clock driver in said first row, and to said ground terminals of said logic elements;

a second row arranged parallel to a longitudinal direction of said first row, said second row including a second secondary clock driver arranged at one end of said second row to be adjacent to said primary power supply wiring and said primary ground wiring, said second secondary clock driver having a clock signal input terminal connected to said primary clock driver means, a power supply terminal connected to said primary power supply wiring, and a ground terminal connected to said primary ground wiring, and a second group of a plurality logic elements, which switch synchronously with the input clock signal, each having a power supply terminal and a ground terminal respectively connected to said primary power supply wiring and said primary ground wiring;

a second secondary power supply wiring for connecting said primary power supply wiring to said power supply terminal of said second secondary clock driver in said second row, and to said power supply terminals of said second group of logic elements;

a second secondary ground wiring for connecting said primary ground wiring to said ground terminal of said second secondary clock driver in said second row and to said ground terminals of said logic elements;

a second clock signal input wiring for connecting the input terminals of said first and second secondary clock drivers and to an output terminal of said primary clock driver means;

a first clock signal wiring for connecting said first secondary clock driver means in said first row to said logic elements; and

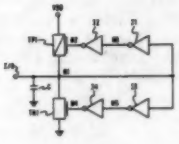
a second clock signal wiring for connecting said second secondary clock driver means in said second row to said logic elements.

4,958,093

VOLTAGE CLAMPING CIRCUITS WITH HIGH CURRENT CAPABILITY

Julie S. Kosson, Burlington, Vt., and Michael J. McLennan, Lafayette, Ind., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 25, 1989, Ser. No. 356,917
Int. Cl.[5] H03K *5/08*
U.S. Cl. 307—540 **31 Claims**



1. A voltage clamping circuit comprising

a voltage source having first and second reference potential terminals,

first and second transistors, each having a control electrode, serially connected between said first and second reference potential terminals of said voltage source,

first control means connected from a common point between said first and second transistors to the control electrode of said first transistor, and

second control means connected from the common point between said first and second transistors to the control electrode of said second transistor, said second control means having characteristics differing from those of said first control means such that said first and second control means are actuated at different levels of voltage applied thereto.

4,958,094

EMITTER FOLLOWER CIRCUIT WITH MOSFET

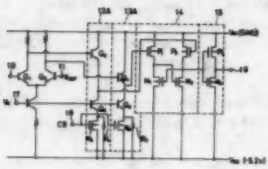
Yasuhiro Ishii, Tokyo, and Isao Fukushi, Yokohama, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

PCT No. PCT/JP88/00923, § 371 Date Jun. 28, 1989, § 102(e) Date Jun. 28, 1989, PCT Pub. No. WO89/02677, PCT Pub. Date Mar. 23, 1989
PCT Filed Sep. 13, 1988, Ser. No. 391,605
Claims priority, application Japan, Sep. 17, 1987, 62-233190
Int. Cl.[5] H03K *17/16*
U.S. Cl. 307—570 **3 Claims**

1. An emitter follower circuit comprising an emitter follower transistor and a current source coupled to the emitter of said emitter follower transistor, said current source including a MOS transistor, said emitter follower circuit being switched

between active and inactive states by switching said MOS transistor by a control signal,

characterized in that said emitter follower circuit comprises current path means provided between the source and



drain of said MOS transistor, for providing a resistance considerably larger than a resistance of the MOS transistor provided during conducting, when the MOS transistor is at least cut off and for passing an extremely small current therethrough at that time.

4,958,095

STARTER-ALTERNATOR FOR A VEHICLE ENGINE

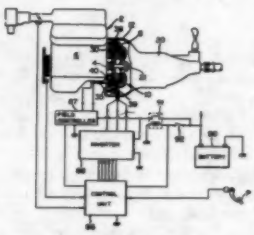
Hiroyasu Uchida, Hiroshima; Kazuhiko Ueda, Higashihiroshima, and Hiroyuki Oda, Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Jun. 10, 1988, Ser. No. 205,188

Claims priority, application Japan, Jun. 10, 1987, 62-145748

Int. Cl.[5] H02K *9/00*

U.S. Cl. 310—59 **25 Claims**



1. A starter-alternator of a vehicle of the type being disposed between a vehicle engine having an output shaft and a transmission comprising:

a rotary field pole member coupled to the output shaft of the vehicle engine and having two series of crow-poles which are interspaced, one series of crow-poles all forming N poles and the other series of crow-poles all forming S poles;

a field winding mounted radially inside the two series of crow-poles;

a stator winding mounted on the two series of crow-poles;

a housing accommodating therein the rotary field pole, the field winding and the stator winding and connecting the vehicle engine and the transmission, said housing being provided with an air passage embedded in a wall thereof for taking in fresh air and directing it to cool at least one of the stator winding and the field winding and an air outlet for discharging air wherein said air passage is provided with an air intake opening facing to the front of the vehicle engine and plurality of air nozzles directing air for the air passage to blow air on and cool the stator winding.

4,958,096

GOVERNOR AND MOTOR ASSEMBLY

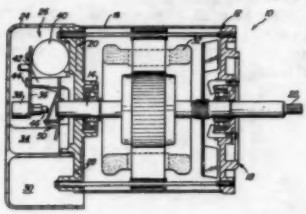
Paul T. Kachuk, Ft. Wayne, Ind., assignor to Flint & Walling, Inc., Kendallville, Ind.

Division of Ser. No. 137,847, Dec. 21, 1987, Pat. No. 4,885,440.

This application Jun. 16, 1989, Ser. No. 367,152

Int. Cl.[5] H02K *11/00;* **H01H** *35/10*

U.S. Cl. 310—68 E **7 Claims**



1. An improved electric motor assembly having a motor housing with a stator assembly disposed therein and a rotor shaft extending therethrough, one end of said rotor shaft extending through an end wall of said housing into an end bell of said motor assembly, said end bell having a control assembly for said motor, said control assembly comprising:

a terminal board fixedly secured to said end wall of said motor housing;

a switch mounted to said terminal board, said switch including an actuator pin extending axially inward from said terminal board;

a capacitor positionally captured between said terminal board and said end wall of said motor housing; and

a centrifugal governor mounted to said one end of said rotor shaft to rotate therewith, said governor engaging said actuator pin of said switch wherein said switch is actuable in accordance with the centrifugal force generated by said rotor shaft and acting upon said governor.

4,958,097

STARTER WITH FLEXING SOLENOID LEVER

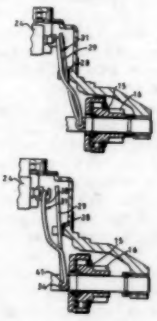
Malcolm C. Woodward, Warley, and Barry Twilton, Solihull, both of England, assignors to Magneti Marelli Electrical Limited, Great Britain

Filed Jun. 27, 1989, Ser. No. 372,069

Claims priority, application United Kingdom, Jun. 28, 1988, 88153663

Int. Cl.[5] H02K *7/20;* **F02N** *11/00, 15/06*

U.S. Cl. 310—83 **7 Claims**



1. A starter motor, for use with an internal combustion engine, comprising an electric motor, a shaft rotated by the

motor and carrying a pinion assembly, a solenoid spaced from said shaft and including an armature movable from a rest position towards an operative position by energization of an electromagnet winding of the solenoid, and a lever assembly mounted for pivotal movement about an axis passing between the solenoid and said shaft, said lever assembly linking the armature of said solenoid and said pinion assembly such that movement of the armature is transmitted to the pinion assembly to move the pinion assembly axially on said shaft from a rest position towards an operative position, said lever assembly comprising a rigid element supported for pivotal movement about said axis and a resilient element carried by said rigid element and coupled at one end to said armature, the end of the lever assembly remote from said solenoid being coupled to said pinion assembly, and said resilient element including a region shaped to flex torsionally in the event of operative movement of said solenoid armature without corresponding movement of the pinion assembly, said region being prestressed during construction of the lever assembly in such a direction that the torsional stressing of said region would be increased by said movement of the solenoid armature relative to the pinion assembly.

4,958,098

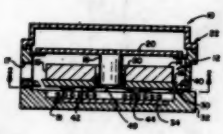
ROTARY DEVICE

Sanwal P. Sarraf, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 942,120, Dec. 16, 1986, abandoned. This application Nov. 23, 1987, Ser. No. 123,836

Int. Cl.[5] H02K *21/12*

U.S. Cl. 310—156 **10 Claims**



1. A rotary device comprising:

a rotor which comprises a first element of a planar motor, said rotor including a radially-extending thrust surface;

means for supporting said rotor for rotational movement, said supporting means including a second element of a planar motor, one of said elements being a printed motor coil and the other element being a generally planar multipolar permanent magnet which is adapted to interact with a field produced by said coil to drive said rotor, said supporting means having a radially-extending bearing surface arranged opposite said thrust surface; and

means on one of said radially-extending surfaces for receiving a fluid upon rotation of said rotor and for controlling said fluid such that the fluid exerts an axial force on the rotor of a magnitude sufficient to displace said rotor in an axial direction.

4,958,099

BRUSHLESS MOTOR

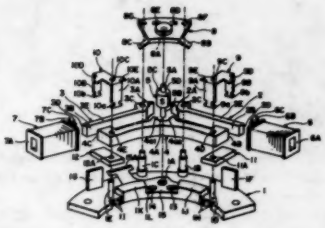
Tatsuo Chigira, Yokohama, and Akira Kurosawa, Yokose, both of Japan, assignors to Canon Kabushiki Kaisha and Canon Denshi Kabushiki Kaisha, both of Tokyo, Japan

Filed Aug. 26, 1988, Ser. No. 236,850

Claims priority, application Japan, Sep. 3, 1987, 62-134935[U]; Sep. 17, 1987, 62-142030[U]; Sep. 17, 1987, 62-142031[U]; Sep. 17, 1987, 62-142032[U]; Nov. 16, 1987, 62-174792[U]; Nov. 16, 1987, 62-174793[U]

Int. Cl.[5] H02K *1/12*

U.S. Cl. 310—254 **7 Claims**



1. A motor comprising:

a magnet rotor having a rotational shaft; and

first, second and third stator members arranged around an outer periphery of said magnet rotor while keeping a uniform air gap,

said first stator member being formed as a shaft and having a first arc-shaped magnetic pole portion having an opening angle of about 90° and a coil supporting portion around which a first field coil is wound at one end of the first stator member,

said second stator member being formed as a shaft and having a second arc-shaped magnetic pole portion having an opening angle of about 90° and a coil supporting portion around which a second field coil is wound at one end of the second stator member, and

said third stator member having third and fourth continuous magnetic pole portions having an opening angle smaller than 180° in a central portion of the third stator member and contacting portions which are in contact with edges of said coil supporting portions of the first and second stator members at both ends of said third and fourth magnetic pole portions, and magnetic circuits constructed by each of the magnetic pole portions of the first and second stator members and each of the magnetic pole portions of the third stator member through said contacting portions, respectively;

a base plate having a member for determining an axially supporting position of said magnet rotor and assembling positions of said first, second, and third stator members;

first and second pin members adapted to be fitted into holes formed near each of the first and second magnetic pole portions of the first and second stator members; and

third and fourth pin members adapted to be fitted into holes formed near said contacting portions of said third stator member.

4,958,100

ACTUATED TRUSS SYSTEM

Edward F. Crawley, Arlington, and Nesbitt Hagood, Cambridge, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Feb. 22, 1989, Ser. No. 313,952

Int. Cl.[5] H01L *41/08*

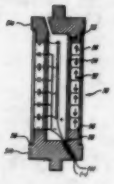
U.S. Cl. 310—328 **20 Claims**

1. A truss member comprising

an elongate cylindrical shell having first and second end-

pieces adapted to couple to a truss structure and place said shell in load-bearing relation to the structure, said shell being formed of a composite material,

a plurality of cylindrical elements of Piezoelectric material axially juxtaposed in said shell to form a load bearing inner column extending between said first and second end-pieces, and



conductive means for interconnecting a circuit with opposed faces of the cylindrical elements to actuate said piezoelectric elements, and

wherein said cylindrical shell is fitted about and bonded to said plurality of cylindrical elements to form a radially-varying axially-homogeneous truss member.

4,958,101

PIEZOELECTRIC ACTUATOR

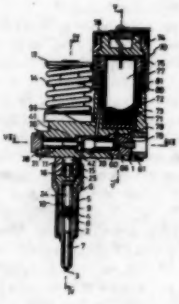
Takeshi Takahashi, Mishima, and Takashi Yamamoto, Susono, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Jul. 28, 1989, Ser. No. 387,616

Claims priority, application Japan, Aug. 29, 1988, 63-112146[U]; Sep. 21, 1988, 63-234820; Sep. 21, 1988, 63-122689[U]

Int. Cl.[5] H01L *41/08*

U.S. Cl. 310—328 **15 Claims**



1. A piezoelectric actuator comprising:

a housing having a piston bore formed therein;

a piston having a first outer wall portion slidably inserted into said piston bore and having a second outer wall portion positioned outside of said piston bore, said piston having at one side thereof an end face which defines a variable volume chamber within said piston bore;

a piezoelectric element supported between said housing and the other side of said piston; and

a hollow cylindrical resilient member fitted onto said second outer wall portion of said piston and inserted between said housing and said piston to apply a compression load onto said piezoelectric element via said piston, said hollow cylindrical resilient member having a plurality of slots formed on an outer circumferential wall thereof and arranged in a point of symmetry about an axis of said hollow cylindrical resilient member.

4,958,102

THREE WAY GAS DISCHARGE LAMP

William E. Wilson, Clifton; Edward W. Morton, Teaneck, and Daniel W. O'Mullan, Bloomfiled, all of N.J., assignors to North American Philips Corporation, New York, N.Y.

Division of Ser. No. 686,871, Dec. 27, 1984, Pat. No. 4,748,368.

This application Nov. 4, 1987, Ser. No. 117,598

The portion of the term of this patent subsequent to May 31, 2005, has been disclaimed.

Int. Cl.[5] H01J *61/34, 61/92*

U.S. Cl. 313—1 **4 Claims**

1. A three-way lamp comprising a housing having first, second and third terminals arranged thereon as provided on a three-way incandescent lamp, said lamp including two gas discharge light tubes, each tube having two electrodes, one tube having its electrodes separately connected to said first and third terminals, the other tube having its electrodes separately connected to said second and third terminals.

4,958,103

HID LAMP WITH MULTIPLE DISCHARGE DEVICES

Cornelis A. Jacobs, Turnhout, Belgium; Norman R. King, Bath, and Dale E. Bradham, Elmira, both of N.Y., assignors to North American Philips Corp., New York, N.Y.

Filed Dec. 21, 1988, Ser. No. 289,281

Int. Cl.[5] H01J *61/34, 61/54*

U.S. Cl. 313—25 **12 Claims**

1. In a high intensity electric discharge lamp having an outer envelope, a pair of elongated discharge devices within said outer envelope, and means for applying a voltage to initially operate one of said discharge devices and to operate the other of said discharge devices after a momentary power interruption during lamp operation and the previously operative discharge device fails to restart, the improvement comprising:

each of said discharge devices having one end operative at a higher temperature than the other end; and

mounting means for mounting said discharge devices laterally adjacent to each other with the higher temperature end of one proximate the lower temperature end of the other discharge device for heating the lower temperature end of an inoperative discharge device with the higher

temperature end of the operative discharge device to facilitate starting of the inoperative discharge device.

4,958,104

DISPLAY DEVICE HAVING FIRST AND SECOND COLD CATHODES

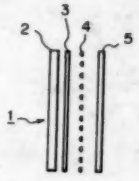
Hidetoshi Suzuki; Mitsuru Yamamoto, both of Atsugi; Toshiaki Majima, Tokyo, and Ichiro Nomura, Yamato, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 86,804, Aug. 19, 1987, abandoned. This application Jun. 29, 1989, Ser. No. 373,636

Claims priority, application Japan, Aug. 20, 1986, 61-192817; Aug. 20, 1986, 61-192818; Aug. 20, 1986, 61-192819

Int. Cl.[5] H01J *31/48, 29/70*

U.S. Cl. 313—495 10 Claims



1. A storage-type image display device, comprising:

a plurality of cold cathodes provided on a surface side of a substrate, said cold cathodes comprising a plurality of first cold cathodes and a plurality of second cold cathodes;

image display means disposed proximate to said cold cathodes and having a space therebetween; and

a storage plate having a plurality of holes therein being disposed between said cold cathodes and said image display and having a space on either side thereof, wherein

said plurality of first cold cathodes emits electron rays impinging on said storage plate, and said plurality of second cathodes emits electron rays impinging on a surface of said image display means, and said storage plate having a plurality of holes being arranged so that the electron rays emitted from said second cathodes may pass through the holes, and wherein said plurality of first and second cold cathodes are arranged two-dimensionally and further comprising a driving signal line for driving said plurality of first and second cold cathodes, said driving signal line having a matrix electrode structure comprising a first electrode group and a second electrode group disposed orthogonal to said first electrode group, wherein said first electrode group connects first and second cold cathodes, and wherein said second electrode group connects only cold cathodes of one of said plurality of first cold cathodes and said plurality of second cathodes.

4,958,105

ROW DRIVER FOR EL PANELS AND THE LIKE WITH INDUCTANCE COUPLING

Edward L. Young, Shelton, and Mohan L. Kapoor, Orange, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 9, 1988, Ser. No. 282,787

Int. Cl.[5] G09G *3/30*

U.S. Cl. 315—169.3 15 Claims

1. In an electrical display panel system, including—

a display panel having row and column electrodes, said panel being capable of displaying indicia thereon in response to appropriate electrical signals to said row and column electrodes from a row driver and column driver, respectively;

at least one electrical power source (V_{in});

a column driver connected to a power source capable of electrically driving said column electrodes; and

an output load, including said row electrodes (C_{panel}) of said panel, which load is essentially capacitive;

a row driver capable of electrically driving said row electrodes, said row driver being powered by said power source; and

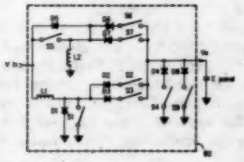
row switches causing the drive signals from said row driver to be sequentially pulsed to said row electrodes;

the improvement in said row driver comprising:

an inductor being provided between the row driver power source and the row electrode panel load;

a first switch (S_1 of FIG. 4; S_1 or S_5 of FIG. 6) with unidirectional current flow (D_1 of FIGS. 4 & 6) being connected to one end of said inductor and to a common voltage reference level, with said power source (V_{in}) being connected to the other end of said inductor; said first switch when closed allowing said power source to provide a current flow through said inductor, storing electrical energy in it;

a second switch (S_3 of FIG. 4; S_3 or S_7 of FIG. 6) with



unidirectional current flow (D_3; D_3 or D_7) being connected in series between the same end of said inductor as said first switch and the essentially capacitive row electrode load (C_{panel}) of the panel, which in turn is connected to said common voltage reference level; the opening of said first switch and closing of said second switch causing the electrical energy in said inductor to be provided to said capacitive row electrode load through said second switch, driving and charging said capacitive row electrode load;

a third switch (S_2 of FIG. 4; S_2 or S_6 of FIG. 6) with unidirectional current flow (D_2; D_2 or D_6) being connected in series between the same end of said inductor as said first switch and the essentially capacitive row electrode load (C_{panel}) of the panel; the opening of said second switch and the closing of said third switch allowing the charged electrical energy in said inductor to be provided back from said capacitive row electrode load to said inductor through said third switch, re-energizing said inductor; the opening of said third switch allowing the energy in the re-energized inductor to be dumped back to said row driver power source.

4,958,106

HIGH-PRESSURE SODIUM DISCHARGE LAMP

Machiel A. M. Hendrix; Johannes A. M. Scheepers, and Nicolaas H. G. Reijnders, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 24, 1989, Ser. No. 301,573

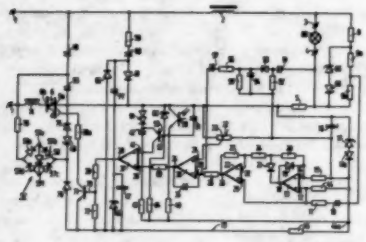
Claims priority, application Netherlands, Feb. 10, 1988, 8800319

Int. Cl.[5] H05B *37/02*

U.S. Cl. 315—208 3 Claims

1. A circuit arrangement for operating a high-pressure sodium lamp comprising: two lamp connection points for connection of the high-pressure sodium lamp, a controlled main switching element having a control electrode connected to a control circuit, a measuring impedance connected in series

with a lamp connection point and a second measuring impedance connected parallel to the lamp connection points, means further connecting said measuring impedances to the control



circuit and a combination of a resistor and a capacitor connected in series arrangement with one of the lamp connection points and further connected to the control circuit.

4,958,107

SWITCHING ARRANGEMENT FOR HID LAMPS

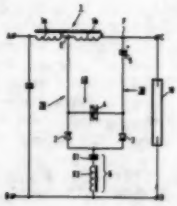
Charles B. Mattas, Glenview, Ill.; Egbert Van Zanten, Eindhoven, Netherlands, and Stefan P. Szuba, Parkridge, Ill., assignors to North America Philips Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 334,658, Apr. 6, 1989, abandoned. This application Sep. 19, 1989, Ser. No. 409,493

Claims priority, application Netherlands, Apr. 13, 1988, 8800952

Int. Cl.[5] H05B *41/14, 37/02*

U.S. Cl. 315—289 **19 Claims**



1. An apparatus for starting and operating a high intensity discharge lamp comprising:

a pair of input terminals for supplying a high frequency voltage to the apparatus,

a pair of output terminals for connection to a high intensity discharge lamp,

means including a step-up transformer for coupling said input terminals to said output terminals, and

a voltage multiplier circuit coupled to a primary winding of said step-up transformer, said voltage multiplier circuit comprising:

a relatively resistance free impedance means,

a first capacitor and a first rectifier element connected in a first series circuit with said impedance means to said primary winding,

a second capacitor and a second rectifier element connected in a second series circuit with said impedance means to said primary winding, and

a voltage responsive switching device connected in a further closed loop series circuit with the second capacitor and said primary winding, whereby when said second capacitor is charged to the breakdown voltage of the switching device the switching device turns on to provide a rapid discharge path for the second capacitor via said primary winding thereby to induce a high voltage pulse in a secondary winding of the transformer for igniting a discharge lamp connected to said output terminals.

4,958,108

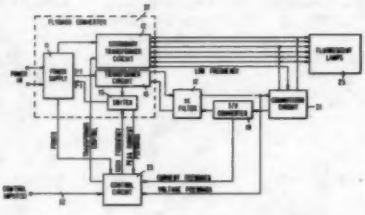
UNIVERSAL FLUORESCENT LAMP BALLAST

Jeffrey A. Jorgensen, Bothell, Wash., assignor to Avtech Corporation, Seattle, Wash.

Filed Feb. 14, 1989, Ser. No. 310,610

Int. Cl.[5] H05B *41/36*

U.S. Cl. 315—307 **15 Claims**



1. A ballast for controlling the operation of a gas discharge lamp comprising:

converter means connectible to a source of power for selectively converting at a first frequency said source power into direct current power;

commutator means operatively connected to said converter means for converting at a second frequency said direct current power therefrom to alternating current power, said commutator means connectible to said gas discharge lamp to provide said alternating current power at said second frequency thereto to cause said gas discharge lamp to emit light;

sensing means connected proximate to said commutator means for sensing power to said gas discharge lamp through said commutator means, and providing lamp power feedback representative thereof; and

control means connected to said converter means, said commutator means, and said sensing means, said control means including input means connected to said converter means for causing said converter means to commence conversion of said source power into direct current power, and said control means including lamp power feedback responsive means responsive to said lamp power feedback to start said gas discharge lamp in accordance with the starting power requirements thereof and operate said gas discharge lamp in accordance with the operating power requirements thereof.

4,958,109

SOLID STATE IGNITOR

Daniel Naum, 2048 Midvale Dr., San Diego, Calif. 92105

Filed Sep. 22, 1988, Ser. No. 247,727

Int. Cl.[5] H05B *41/36*

U.S. Cl. 315—307 **10 Claims**

1. An ignitor circuit for producing a high-voltage arc current for igniting an arc lamp or the like comprising:

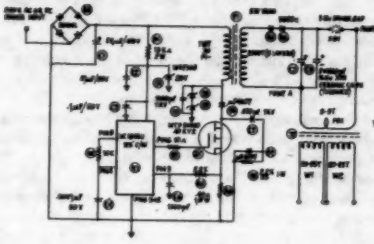
(a) a DC power source;

(b) a flyback transformer having a primary coil and a flux-coupled secondary coil;

(c) a switching device in series with said primary coil and said power source such that the opening of said switching device interrupts the current in said primary coil;

(d) a solid state current-sensing controller operatively connected to said primary coil and having an oscillator which produces a periodic output voltage to said switching device to open same upon said controller sensing current in said primary coil substantially equal to the saturation current therein; and,

(e) a second-stage circuit connected to said secondary coil for conditioning the power induced in said secondary coil



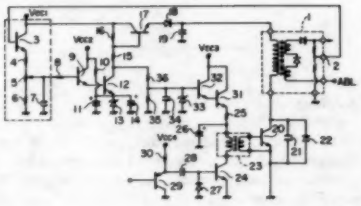
to produce a high voltage arc-crossing current to ignite an arc lamp.

4,958,110

TELEVISION RECEIVER

Akihiko Hayase, Takatsuki, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jan. 25, 1990, Ser. No. 470,133
Claims priority, application Japan, Jan. 31, 1989, 1-21419
Int. Cl.[5] H01J *29/70, 29/76*
U.S. Cl. 315—408 **1 Claim**



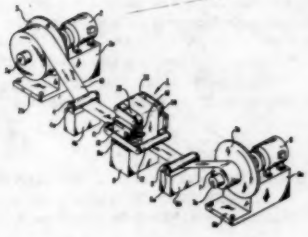
1. A television receiver comprising: a fly-back transformer for supplying a high voltage to a cathode ray tube; a circuit for detecting a high voltage produced by said fly-back transformer; a comparison circuit for comparing the voltage detected by said high voltage detection circuit with a reference voltage; a voltage control circuit for controlling the magnitude of a voltage supplied to said fly-back transformer in accordance with a control signal produced by said comparison circuit; an output circuit including an output transistor for driving said fly-back transformer to generate the high voltage; a drive circuit for driving said output circuit; and a voltage control circuit for controlling a supply voltage to said drive circuit in accordance with the control signal produced by said comparison circuit.

4,958,111

TENSION AND WEB GUIDING SYSTEM

Noel J. Gago, 28 Midway Ct., Rockaway, N.J. 07866

Filed Sep. 8, 1989, Ser. No. 404,774
Int. Cl.[5] B65H *59/38*
U.S. Cl. 318—6 **26 Claims**



1. A system for controlling the tension of a tape or web as it passes over a series of rollers, said system comprising in combination an unwind roller for accommodating a spool of tape or web in unwinding relation at unwind end of said system, and a windup roller for winding up said tape or web at the windup end; means for controlling the tension of said web or tape on said unwind rollers at said unwind end;

and means comprising a windup motor for controlling the rate of rotation of said windup roller at said windup end;

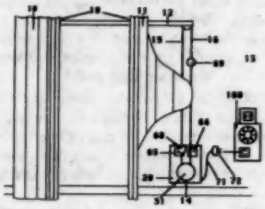
a frame comprising at least one pair of bearing arms supporting a pair of freely rotating rollers interposed in the path of said tape or web as it passes between said unwind roller and said windup roller;

a flexible plate disposed in fixed relation at two of its opposite edges to said bearing arms in a plane substantially parallel to the plane of said passing tape or web and in substantially tangential relation to the underside of said freely rotating rollers, said plate being suspended to flex in response to the pressure exerted by said web or tape as it passes over said freely rotating rollers;

a control circuit mounted in said frame and connected in energy transfer relations with said windup motor and said means for controlling tension at said unwind end;

pressure sensitive means connected to said plate and responsive to the changes in pressure to send a signal to said control circuit to change the rotational speed of said windup motor and to control the tension at said unwind end.

4,958,112
DRAPERY ACTUATOR OPERATED BY LAMP TIMER AND HAND-HELD WIRELESS REMOTE CONTROL
Michael A. Zerillo, 4143 Elizabeth La., Annandale, Va. 22003
Filed Sep. 27, 1989, Ser. No. 413,283
Int. Cl.[5] A47H *5/032*
U.S. Cl. 318—280 **21 Claims**



6. A mechanism for driving operable means of one or more movable members comprised in an assembly means, wherein said mechanism drives said movable members between position settings, said position settings comprise any two positions selectable within range of motion of said movable members, said mechanism comprising:

drive means for driving engagement with said operable means;

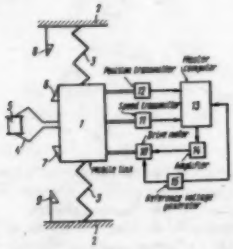
actuating means for establishing said position settings;

motor control means comprising automatic reset means for controlling automatic operation and for resetting said mechanism, said motor control means is responsive to said actuating means;

electric reversible motor means having shaft means, said drive means is affixed to said shaft means and thereby rotatable in either direction around its axis by said motor means, said motor means is responsive to said motor control means;

conductor means for connecting said motor control means to an electric supply means, said electric supply means comprising a switching means for switching electricity ON and OFF.

4,958,113
METHOD OF CONTROLLING MECHANICAL RESONANCE HAND
Teodor S. Akinfiev, ulitsa Marshala Timoshenko, 44, kv.48., Moscow, U.S.S.R.
Filed Mar. 24, 1989, Ser. No. 328,169
Int. Cl.[5] G05B *19/42*
U.S. Cl. 318—568.18 **20 Claims**



1. A method of controlling a mechanical resonance hand in its travel from an initial position to its target position, including the steps of:

releasing said hand in an initial position;

moving said hand towards said target position, while feeding a first supply voltage with said hand moving over at least part of the path of said travel;

with said hand moving towards said target position, dividing said path of said travel of said hand into a portion of registering the parameters of the motion of said hand and a portion of correcting the law of the motion of said hand;

feeding a second supply voltage of a reference voltage value with said hand moving over said portion of registering the parameters of the motion of said hand;

measuring and registering the speed and running coordinate of said hand in its travel over said portion of registering the parameters of the motion of said hand;

measuring the speed of said hand at a corresponding point of said path of said travel with said hand moving over said portion of correcting the law of the motion of said hand;

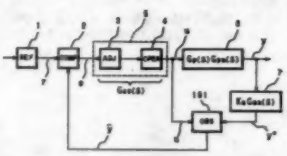
computing the difference between the speed registered at said portion of registering the parameters of the motion of said hand and the speed measured at said corresponding point of said portion of correcting the law of the motion of said hand;

shaping a third voltage value which is a function of said computed difference and of a sign opposite to the sign of said difference;

with said hand moving over at least a part of said portion of correcting the law of the motion of said hand, feeding a fourth supply voltage value which is an algebraic sum of said reference voltage value and said third voltage; and

retaining said hand at said target position.

4,958,114
FEEDBACK CONTROLLER
Masaharu Ogawa, Amagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Nov. 23, 1988, Ser. No. 275,399
Claims priority, application Japan, Nov. 25, 1987, 62-298154
Int. Cl.[5] G05B *5/01*
U.S. Cl. 318—616 **32 Claims**



1. A feedback controller comprising:

a reference input element converting an aimed value of an amount to be controlled or an amount of state of an object to be controlled into an electrical reference input signal, wherein an amount of operation is an input signal of said object to be controlled and said amount to be controlled or said amount of state is an output signal thereof,

a comparing means for comparing said electrical reference input signal with a feedback signal,

a detecting means for detecting the amount to be controlled or the amount of state of said object to be controlled, and

a state observing means being inputted said amount of operation and said amount to be controlled or said amount of state and outputting a presumed value of said amount to be controlled or said amount of state,

wherein said state observing means feeds back the presumed value of said amount to be controlled or said amount of state to said comparing means,

wherein said state observing means comprises a gain element simulating desired transfer characteristics of said object to be controlled and said detecting means and an integrator, and

wherein the frequency band of said state observing means is set lower than a frequency at which the transfer characteristic of said object to be controlled or said detecting means deviates from said desired transfer characteristic or a frequency of detection noise mixed into said detecting means.

4,958,115

CAPACITIVELY COMMUTATED BRUSHLESS DC SERVOMOTORS

Gabriel L. Miller, Westfield, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Nov. 28, 1988, Ser. No. 276,751
Int. Cl.[5] H02K *41/00*
U.S. Cl. 318—662 **36 Claims**

1. A motor comprising:

a plurality of electromagnetic elements defining a first surface and having poles facing said first surface;

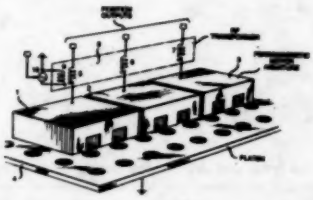
an opposing predominantly ferromagnetic member defining a second surface essentially parallel to said first surface but spatially modulated in one or more directions of intended relative motion between said elements and said member;

said elements being organized in groups corresponding to a desired number of phases of excitation of the motor, the pole spacing of each of said elements matching a spatial modulation of said member in a first direction, the inter-element spacing of said elements in said first direction being equal to an integral multiple of the period of the spatial modulation in said first direction divided by the number of phases;

means for establishing multi-phase electromagnetic fields between said member and said elements to provide motive force in the selected direction, including

means for commutating said multi-phase fields to provide substantial continuity of said motive force;

said motor being characterized in that



the commutating means comprises means for sensing capacitive effects related to the relative positions of said member and said elements, and

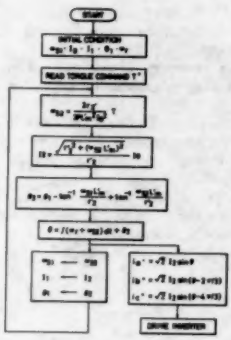
means for controlling said multi-phase fields in response to said capacitive effects.

4,958,116

METHOD FOR CONTROLLING AC INDUCTION MOTOR

Kenji Hirose, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 18, 1984, Ser. No. 621,765
Int. Cl.[5] H02P *5/40*
U.S. Cl. 318—800 **1 Claim**



1. A method for controlling an AC induction motor in the manner of a DC motor through an inverter and in response to an input torque command, which AC induction motor is initially operating with conditions of a torque command of T_1, a slip frequency of ω_{S1}, an exciting current of I_0, a stator current amplitude of I_1, a stator current angle of θ_1, and a rotor angular speed of ω_r, comprising the steps of:

(a) reading a new torque command T_2:

(b) computing a new rotor angular speed ω_{S2} as:

$$\omega_{S2} = \frac{2r'_2}{3PL'^2_m I_0^2} T_2,$$

where $r_2' = x_m^2 r_2/x_2^2$, r_2 is the resistance of the rotor of the AC inductance motor, P indicates the number of pole pairs of the motor, and L_m' is a magnetizing inductance of the motor defined by $j\omega L_m' = x_m' = x_m^2/x_2$, where ω is the angular frequency of the applied voltage, x_m is the magnetizing reactance of the rotor, and x_2 is the self reactance of the rotor;

(c) computing a new stator current amplitude I_2 as:

$$I_2 = \frac{\sqrt{r'^2_2 + (\omega_{S2}L'_m)^2}}{r'^2_2} I_0;$$

(d) computing a new stator current angle θ_2 as:

$$\theta_2 = \theta_1 + \tan^{-1}\frac{\omega_{S2}L'_m}{r'_2} - \tan^{-1}\frac{\omega_{S1}L'_m}{r'_2};$$

(e) computing a phase angle θ as:

$$\theta = (\omega_r + \omega_{S2})\Delta T + \theta_2,$$

where ΔT is a time interval from a time when the stator phase angle is θ_1 until new current instruction values are applied to the inverter;

(f) computing the new current instruction values as:

$$i_a^* = \sqrt{2} I_2 \sin\theta,$$

$$i_b^* = \sqrt{2} I_2 \sin(\theta - 2\pi/3), \text{ and}$$

$$i_b^* = \sqrt{2} I_2 \sin(\theta - 4\pi/3); \text{ and}$$

(g) applying the new current instruction values to the inverter to drive the motor.

4,958,117

FREQUENCY CONTROL BASED ON SENSING VOLTAGE FED TO AN INDUCTION MOTOR

Russel J. Kerkman, Milwaukee, and Brian J. Seibel, Mequon, both of Wis., assignors to Allen-Bradley Company, Inc., Milwaukee, Wis.

Filed Sep. 29, 1989, Ser. No. 414,684
Int. Cl.[5] H02P 5/40
U.S. Cl. 318—805 **4 Claims**

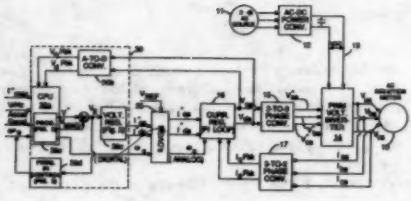
1. A method for improved control of current to an induction motor without sensing the rotational speed of the motor, the method comprising:

controlling an inverter voltage control signal to further control a voltage signal to be applied to the induction motor;

determining a voltage feedback magnitude in response to sensing of the inverter voltage control signal;

generating a voltage command magnitude in response to operator inputs;

generating a current command signal in response to a difference between the voltage command magnitude and the voltage feedback magnitude;



generating the inverter voltage control signal in response to the current command signal and in response to an operating frequency signal;

limiting the magnitude of the current command signal when the current command reaches a predetermined limit; and

in response to limiting action on the current command, generating an operating frequency signal to further control the inverter voltage control signal in response to the difference between the voltage command magnitude and the voltage feedback magnitude.

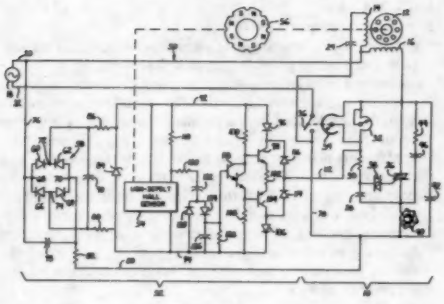
4,958,118

WIDE RANGE, SELF-STARTING SINGLE PHASE MOTOR SPEED CONTROL

Joseph R. Pottebaum, Brookfield, Wis., assignor to A. O. Smith Corporation, Milwaukee, Wis.

Filed Aug. 28, 1989, Ser. No. 399,231
Int. Cl.[5] H02P 5/34, 5/40
U.S. Cl. 318—727 **16 Claims**

1. A speed control circuit for a single phase AC induction motor having a main winding and an auxiliary winding both connectable to an AC power source, comprising a phase control circuit for connecting said main winding to said AC source at a variable time during a half cycle of said AC source, and including delay means delaying connection of said main winding to said AC source for a variable delay interval following the beginning of the half cycle, such that said main winding is



disconnected from said AC source during said delay interval during an initial portion of the half cycle, and is connected to said AC source during the remaining portion of the half cycle, such that the shorter the delay interval the longer the connection time of said main winding to said AC source and the greater the voltage applied to said main winding and the greater the torque developed by the motor, a boost circuit including speed sensor means sensing motor speed and altering said delay interval in response thereto.

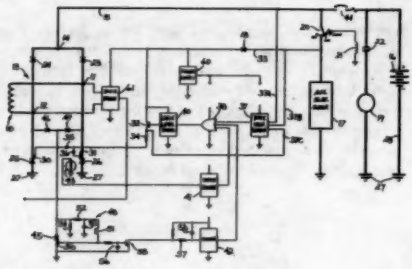
4,958,119

VOLTAGE REGULATORS FOR PERMANENT MAGNET ALTERNATORS

Arthur O. Fitzner, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Oct. 17, 1988, Ser. No. 258,570
Int. Cl.[5] H02J 7/14; H02P 9/00
U.S. Cl. 322—91 23 Claims

1. In an electrical system for an internal combustion engine having a permanent magnet alternator, said system including a bridge rectifier for converting the alternator output to a positive direct current output to the system, said rectifier containing bridge control SCR's connected to receive continuous gate drive current and a crowbar SCR for protecting said system against overvoltage, a crowbar SCR recovery timer comprising:



first circuit means for sensing operation of said crowbar SCR and for generating a signal representative of said operation; and,

second circuit means responsive to said crowbar SCR operating signal for interrupting gate drive current to the bridge control SCR's and temporarily shutting down said bridge rectifier for a time period sufficient to allow recovery of said crowbar SCR.

4,958,120

DUAL FEEDBACK TUNING METHOD AND APPARATUS

Venugopal Gopinathan, New York, N.Y., and Khen-Seng Tan, Plano, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

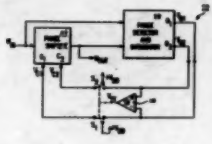
Filed Dec. 27, 1988, Ser. No. 290,215
Int. Cl.[5] H03K 5/00; H03L 7/00
U.S. Cl. 328—155 41 Claims

13. A feedback system for controlling the variance of a varying phase angle of an output of monolithic continuous time filter, comprising:

a phase detector for receiving said varying phase angle and sensing an error between said varying phase angle and a reference value;

first feedback circuitry coupled to said phase detector and constantly generating a first control signal operable to correct a first type of error sensed by said phase detector between said varying phase angle and said reference value;

second feedback circuitry coupled to said phase detector and constantly generating a second control signal operable to correct a second type of error sensed by said phase



detector between said varying phase angle and said reference value;

switching circuitry coupled to said first and second feedback circuitries for transmitting a selected one of said first and second control signals to said filter while inhibiting the transmission of the other of said first and second control signals thereto in response to predetermined values of said first and second control signals; and

a respective control signal input of said filter for receiving said selected one of said first and second control signals and correcting said varying phase angle in response thereto.

4,958,121

PROTECTION OF POWER CONVERTERS FROM VOLTAGE SPIKES

Andrea Cuomo; Claudio Diazzi, both of Milano, Italy, and Klaus Rischmuller, Aix en Provence, France, assignors to SGS-Thomson Microelectronics s.r.l., Brianza, Italy

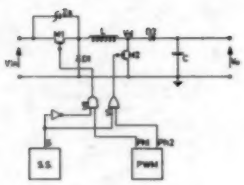
Filed Nov. 30, 1989, Ser. No. 444,553

Claims priority, application Italy, Nov. 30, 1988, 83685 A/88

Int. Cl.[5] H02M *3/158*

U.S. Cl. 323—224 **7 Claims**

1. In a power converter circuit operating in a switching mode and comprising an inductance, a first analog switch connected substantially in series with said inductance between a terminal of the latter and a power distribution rail and a second analog switch connected between the other terminal of the inductance and a common potential node of the circuit and wherein said analog switches are driven respectively by a first and a second driving signals generated by a Pulse Width Modulation control circuit;



a circuit arrangement for protecting the circuit from voltage spikes occurring on said power distribution rail, comprising:

a protection voltage limiting device functionally connected across said first analog switch;

at least a spike sensor capable of generating a logic signal in presence of a voltage spike on the power distribution rail;

logic means for driving said first and second analog switches capable of opening said first analog switch and closing said second analog switch when said spike sensor generates said logic signal in presence of a voltage spike.

4,958,122

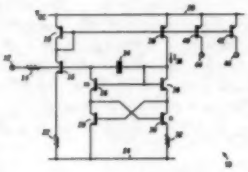
CURRENT SOURCE REGULATOR

William E. Main, Mesa, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 18, 1989, Ser. No. 452,080

Int. Cl.[5] G05F *3/22*

U.S. Cl. 323—315 **11 Claims**



1. A current source regulator including at least one output transistor having a base, an emitter coupled to a first source of operating potential and a collector for providing an output current of a predetermined magnitude proportional to absolute temperature, comprising:

a first transistor having a base, an emitter and a collector, said base being responsive to an enable signal, said emitter being coupled to a second source of operating potential;

a second transistor having a base, an emitter and a collector, said base being coupled to said collector of said first transistor and to the base of the output transistor, said emitter being coupled to the first source of operating potential; and

a feedback circuit coupled between said collector of said second transistor and said base of said first transistor for developing a potential at said base of said first transistor to control the potential developed at said base of said second transistor such that the current flowing through the latter is proportional to absolute temperature which also maintains the predetermined magnitude of the output current proportional to absolute temperature.

4,958,123

CIRCUIT ARRANGEMENT FOR PROCESSING SAMPLED ANALOGUE ELECTRICAL SIGNALS

John B. Hughes, Hove, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 16, 1988, Ser. No. 286,600

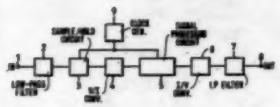
Claims priority, application United Kingdom, Dec. 23, 1987, 8729987; Jul. 6, 1988, 8816072

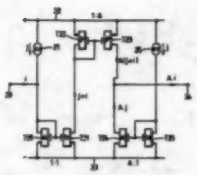
Int. Cl.[5] G05F *3/24*

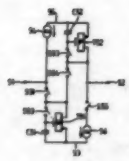
U.S. Cl. 323—316 **47 Claims**

1. A circuit arrangement for processing samples analog electrical current signals comprising: means for combining, in predetermined proportions, an input sample current in a present sample period with current derived from input sample current in one or more preceding sample periods, and means for deriving a processed output signal from the combined current produced by the combining means in successive sample periods; wherein the circuit arrangement further comprises a plurality of circuit modules, each circuit module having a current input for receiving a bidirectional input signal current and a current output for supplying a bidirectional output signal current, means for adding a bias current to the bidirectional input signal current to produce a unidirectional current for

processing by the circuit module, and means for subtracting a suitably scaled bias current from a processed unidirectional







current to produce a bidirectional signal current at the current output of the circuit module.

4,958,124

MULTI-CHANNEL VOLTAGE DETECTOR

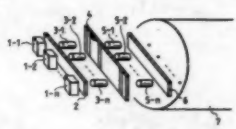
Musubu Koishi; Shinichiro Aoshima, and Yutaka Tsuchiya, all of Shizuoka, Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan

Filed Sep. 16, 1988, Ser. No. 245,253

Claims priority, application Japan, Sep. 18, 1987, 62-235367

Int. Cl.[5] G01R *29/12, 31/00*; G01B *9/02*

U.S. Cl. 324—96 **15 Claims**



1. A multi-channel voltage detector for detecting multi-channel electrical signals comprising:

electro-optic conversion means provided thereon with a plurality of electrical circuits for receiving corresponding multi-channel electrical signals and for supplying voltages to corresponding locations on said electro-optic conversion means to change the refractive index at each of said locations according to the supplied voltages;

light supplying means for supplying at least one light beam having a predetermined polarization to each of said locations, said light beam being transmitted through said electro-optic conversion means at each of said locations to provide emergent light beams corresponding to each of said locations and each of said emergent light beams having a polarization different from said predetermined polarization in accordance with the change in the refractive index of said corresponding location; and

photodetecting means for converting the changes in polarization of said emergent light beams to the changes in optical intensity thereof and for simultaneously detecting said changes in optical intensity of said emergent light beams in parallel, thereby simultaneously detecting said multi-channel electrical signals in parallel.

4,958,125

METHOD AND APPARATUS FOR DETERMINING CHARACTERISTICS OF THE MOVEMENT OF A ROTATING DRILL STRING INCLUDING ROTATION SPEED AND LATERAL SHOCKS

Stuart Jardine, Cambridge, England; Dominic McCann, Paris, France, and Marc Lesage, Missouri City, Tex., assignors to Anadrill, Inc., Sugar Land, Tex.

Filed Nov. 22, 1989, Ser. No. 441,683

Claims priority, application United Kingdom, Dec. 3, 1988, 8828286

Int. Cl.[5] G01P *3/42, 15/00*; E21B *47/00*

U.S. Cl. 324—162 **12 Claims**

6. An apparatus for determining at least one characteristic of the movement of a rotating drill string, said apparatus comprising:

(a) means for measuring the centripetal acceleration of said drill string at at least two opposite ends of a drill string diameter, thereby obtaining two centripetal acceleration signals ac1 and ac2;

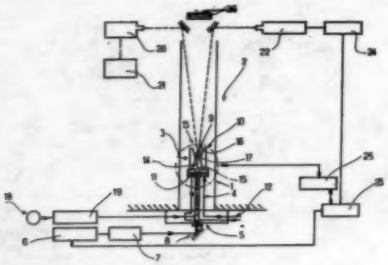
(b) means for combining said signals ac1 and ac2 so as to obtain a combined signal dependent on only one characteristic of said movement of said drill string; and

(c) means for deriving said characteristic from said combined signal.

4,958,126
PROBE FOR MAGNETIC RESONANCE SPECTROMETRIC MEASURES AT VERY HIGH TEMPERATURES

Christian Brevard, Wissembourg; Jean-Pierre Coutures, Orleans; Dominique Massiot, Orleans; Jean-Claude Rifflet, Orleans, and Francis Taulelle, Bourg La Reine, all of France, assignors to Sadis Bruker Spectrospin, S.A., Wissembourg, France

Filed Mar. 1, 1989, Ser. No. 317,508
Claims priority, application France, Mar. 1, 1988, 88-02740
Int. Cl.[5] G01R *33/20*
U.S. Cl. 324—318 **15 Claims**

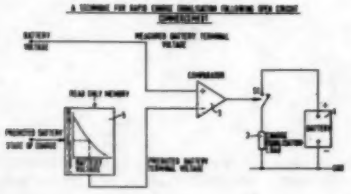


1. Improved probe for spectrometric measuremerts of magnetic resonance at very high temperatures comprising a resonator (3) with hollow body containing a sample (9) to be analyzed, characterized by the fact that a coherent light beam is used as the means of heating the sample (9) together with levitation within the interior volume of the resonator as the means of decoupling the aforesaid sample (9) from its surroundings.

4,958,127
METHOD AND APPARATUS FOR DETERMINING THE STATE OF CHARGE OF A BATTERY

Malcolm Williams, West Midlands; Carmichael Mackie, and Peter W. Barbour, both of Warwickshire, all of United Kingdom, assignors to BL Technology Limited, Lighthorne, England

Filed Jun. 2, 1986, Ser. No. 870,188
Claims priority, application United Kingdom, Jun. 19, 1985, 8515462
Int. Cl.[5] G01N *27/46*
U.S. Cl. 324—426 **20 Claims**

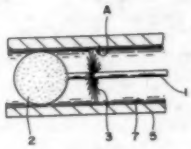


1. A method of determining the state of charge of a battery which is subjected to repeated cycles of partial charge and discharge including the steps of (1) selecting a quiescent interval during which substantially no charging or discharging current flows through the battery (2) applying for a short period of time, during said quiescent interval, a specific predetermined load to the battery to produce a desired discharging current flow through the battery to accelerate stabilization of the charge distribution in the battery (3) removing said load to thereby allow stabilization of the charge distribution in the battery to continue for a predetermined time delay of at least two hours and (4) measuring the terminal voltage of the battery after said time delay and evaluating the state of charge of the battery by comparing the measured voltage with known data on the relationshipe between the terminal voltage and the state of charge of the battery.

4,958,128
METHOD OF EXAMINING AN INSIDE SURFACE-COATED METALLIC PIPE AND APPARATUS

Takaharu Tomoyasu, and Kanji Miyamoto, both of Ichihara, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Nov. 21, 1989, Ser. No. 439,705
Claims priority, application Japan, Nov. 22, 1988, 63-295345
Int. Cl.[5] B61B *13/08;* **G01N** *27/02*
U.S. Cl. 324—559 **5 Claims**



3. An apparatus for detecting a poorly coated portion of an inside surface of a metal pipe coated with insulation coat, comprising:

a plurality of pigs provided on a conductor at predetermined intervals;

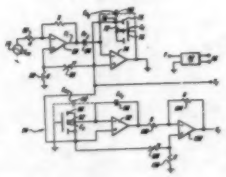
a running element provided with a plurality of electrode needles extending radially on said conductor and positioned between the plurality of pigs; and

a pressure adjusting apparatus for generating a pressure difference in front of and back of said running element inside said pipe, said pressure adjusting apparatus being connected to the pipe into which the running element is to be inserted.

4,958,129
PREALIGNER PROBE

Noel S. Poduje, Needham Heights, and Roy E. Mallory, Bedford, both of Mass., assignors to ADE Corporation, Bedford, Mass.

Filed Mar. 7, 1989, Ser. No. 320,237
Int. Cl.[5] G01R *27/26*
U.S. Cl. 324—661 **19 Claims**



1. A system for capacitive edge detection of a supported member comprising:

a member where the position of an edge of said member is to be detected;

a first probe positioned proximate to said member near the edge thereof and having a parameter varying as a function both of a distance from said probe to said member and displacement of a portion of said probe beyond the edge of said member;

a second probe positioned near said first probe and closer to an interior location of said member than said first probe, said second probe having a parameter varying with distance of said second probe from said member;

a first operational amplifier having the capacitance sensed by the electrode of the first probe in a feedback loop thereof;

a second operational amplifier having the capacitance sensed by the electrode of the second probe in an input circuit thereof and;

a source of A.C. excitation driving said first operational amplifier.

4,958,130

EVALUATION METHOD OF CORROSION OF STEEL MATERIAL EMBEDDED IN CONCRETE

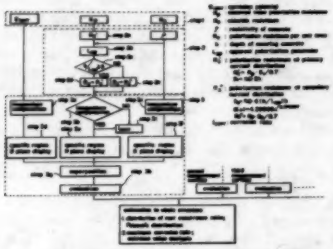
Noriyasu Mochizuki, Hannou, and Hiroji Nakauchi, Okegawa, both of Japan, assignors to Nakagawa Corrosion Protecting Co., Ltd., Tokyo, Japan

Filed Mar. 23, 1989, Ser. No. 327,992

Claims priority, application Japan, Apr. 4, 1988, 63-81347

Int. Cl.[5] G01N *17/02*

U.S. Cl. 324—700 **3 Claims**



1. An evaluation method of corrosion of a steel material embedded in a concrete comprising:

the step of measuring a corrosion potential E_{corr} of the steel material at each of a plurality of measuring points on the surface of the concrete positioned over the steel material by use of a reference electrode locatable or disposed at each measuring point, and of measuring the polarization resistance R_p of the steel material and the concrete resistance R_S at each measuring point by applying electric current to the steel material through a sensor including a counter electrode and a reference electrode locatable or disposed at each of said plurality of measuring points; the step of converting the measured values of said polarization resistance R_p and concrete resistance R_S at each of said measuring points to a real polarization resistance R_c and resistivity ρ of the concrete; and a step of evaluating the state of corrosion of said steel material on the basis of and by combining three parameters, at each measuring point, of said corrosion potential E_{corr}, real polarization resistance R_c and resistivity ρ.

4,958,131

CIRCUIT ARRANGEMENT FOR THE COMBINED APPLICATION OF AN INDUCTIVE AND CAPACITATIVE DEVICE FOR THE NON-DESTRUCTIVE MEASUREMENT OF THE OHMIC RESISTANCE OF THIN LAYERS

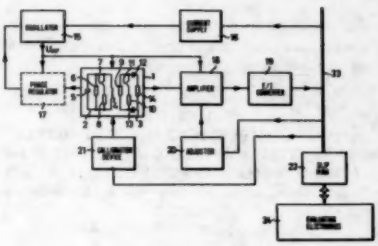
Gernot Thorn, Hanau, Fed. Rep. of Germany, assignor to Leybold Aktiengesellschaft, Hanau, Fed. Rep. of Germany

Filed Apr. 27, 1989, Ser. No. 345,032

Claims priority, application Fed. Rep. of Germany, Apr. 30, 1988, 3815010

Int. Cl.[5] G01B *7/08*; G01R *33/20*

U.S. Cl. 324—708 **13 Claims**



1. A circuit arrangement for the non-destructive measurement of the ohmic resistance of a thin layer using combined inductive and capacitive effects, said arrangement comprising:

an inductive device (2) arranged in the vicinity of the layer to be measured and inducing eddy currents in this layer which weaken the magnetic field of the inductor (4);

a first capacitive device (3) containing an electrode arranged in the vicinity of the layer to be measured;

a second capacitive device (5) forming a resonant circuit with said inductive device;

a high frequency oscillator (15) coupled to said inductive device (2), said second capacitive device (5) and said electrode of said first capacitive device (3) and forming an oscillator circuit with said second capacitive device (5) said inductive device (4) and an ohmic resistance (6) of said thin layer;

a means for always tuning said oscillating circuit to resonance;

a means for eliminating an influence of non-ohmic resistance on a predetermined non-ohmic resistance of the capacitive device; and

a means for detecting a current flow into both the inductive and first capacitive device and for determining the ohmic resistance of said thin layer from said current.

4,958,132

COMPLEMENTARY METAL-OXIDE-SEMICONDUCTOR TRANSLATOR

William C. Plants, Santa Clara, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed May 9, 1989, Ser. No. 349,116

Int. Cl.[5] H03F *1/34*

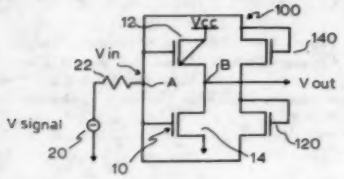
U.S. Cl. 330—110 **8 Claims**

1. A complementary metal-oxide semiconductor translator comprising:

means for amplifying an input signal having an input node and an output node;

a first MOSFET transistor connected between said input node and said output node for clamping a first feedback

signal from said output node to said input node of said means for amplifying an input signal; and



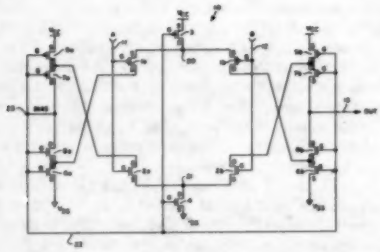
second clamp means for clamping a second signal from said input node to said output node of said means for amplifying an input signal.

4,958,133

CMOS COMPLEMENTARY SELF-BIASED DIFFERENTIAL AMPLIFIER WITH RAIL-TO-RAIL COMMON-MODE INPUT-VOLTAGE RANGE

Mel Bazes, Haifa, Israel, assignor to Intel Corporation, Santa Clara, Calif.

Filed Nov. 13, 1989, Ser. No. 434,339
Int. Cl.[5] H03F 3/45
U.S. Cl. 330—253 **8 Claims**



1. A differential amplifier having an improved common-mode input-voltage range for providing common-mode rejection while providing differential-mode amplification through said extended range, comprising:

a first, second, third, and fourth transistors coupled in series between a first voltage and a second voltage and having their gates coupled together to a junction of said second and third transistors which junction forming a bias node;

a fifth, sixth, seventh, and eighth transistors also coupled in series said first voltage and said second voltage, and also having their gates coupled together to the gates of said first, second, third, and fourth transistors;

a ninth transistor coupled between said first voltage and a first node;

a tenth transistor coupled between a second node and said second voltage;

said ninth and tenth transistors having their gates coupled together to the gates of said first, second, third, and fourth transistors;

an eleventh transistor coupled between said first node and the junction of said third and fourth transistors;

a twelfth transistor coupled between said second node and the junction of said first and second transistors;

said eleventh and twelfth transistors having their gates coupled together to receive a first differential input signal;

a thirteenth transistor coupled between said first node and a junction of said seventh and eighth transistors;

a fourteenth transistor coupled between said second node and a junction of said fifth and sixth transistors;

said thirteenth and fourteenth transistors having their gates coupled together to receive a second differential input signal;

said biasing node providing a negative feedback in order to compensate for circuit variations;

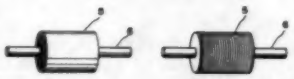
said biasing node also providing for common-mode rejection, but providing differential-mode amplification.

4,958,134

NOISE SUPPRESSION DEVICE COMPRISING A TOROID WINDING

Takao Sawa; Masami Okamura; Taiju Yamada; Takao Kusaka, all of Yokohama, and Hiroshi Sasaki, Chigasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 31, 1988, Ser. No. 238,721
Claims priority, application Japan, Sep. 4, 1987, 62-220341; Sep. 4, 1987, 62-220342; Sep. 4, 1987, 62-220343; Sep. 22, 1987, 62-236142
Int. Cl.[5] H03H 7/01
U.S. Cl. 333—12 **8 Claims**



1. A toroid-shaped noise suppression device comprising:

at least one member selected from the group consisting of plural windings of an amorphous magnetic alloy ribbon and a plurality of laminated ring-shaped pieces formed from an amorphous magnetic alloy ribbon, and

said member having a circular through-hole adapted to receive one of an electrical line and a lead, a largest cross-sectional length of said line or lead being L,

said ribbon and said through-hole forming a circular shaped device having an average diameter Do that is an arithmetic means value of the outer diameter of the device and the diameter of the through-hole, wherein $L < Do \leqq 5L$ and L is smaller than the diameter of the through-hole, said amorphous magnetic alloy ribbon comprising an amorphous magnetic alloy represented by the formula:

$$(M_{1-a}M'_a)_{100-b}V_b \quad (I)$$

wherein M represents at least one element selected from the group consisting of Fe and Co; M' represents at least one element selected from the group consisting of Ti, V, Cr, Mn, Mi, Cu, Zr, Nb, Mo, Ta and W; Y represents at least one element selected from the group consisting of B, Si, C and P; and a and b represents numbers satisfying $0 \leqq a \leqq 0.15$ and $10 \leqq b \leqq 35$, respectively.

4,958,135

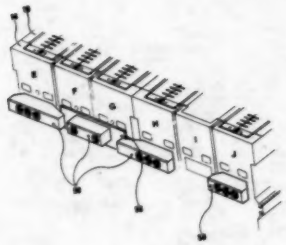
HIGH RATING MOLDED CASE MULTIPOLE CIRCUIT BREAKER

Pierre Baginski, Grenoble; Jean-Pierre Nebon, St. Martin le Vinoux, and Marc Bur, Grenoble, all of France, assignors to Merlin Gerin, France

Filed Dec. 5, 1988, Ser. No. 279,456
Claims priority, application France, Dec. 10, 1987, 87 17446
Int. Cl.[5] H01H 75/00
U.S. Cl. 335—8 **10 Claims**

1. A low-voltage multipole circuit breaker, for high current intensities, comprising a plurality of poles juxtaposed inside an insulating molded case, each pole comprising a pair of separable contacts, an arc chute, a pair of contact terminal pads connected to the separable contacts and protruding outwards from the case, and a current transformer disposed around one of the contact terminal pads and whose output is connected to

a trip device common to the different poles, each pair of contact terminal pads being connected to a pair of connecting strips designed to be connected to a phase of a mains system to be protected, wherein each connecting strip of at least one of the pairs of connecting strips designed to be connected to one of the main phases, is connected to at least two adjacent



twinned poles, electrically arranged in parallel, each connecting strip of at least one of the pairs of connecting strips associated with another pole of the circuit breaker having a width such that it extends laterally beyond said pole and partially overlaps the immediately adjacent pole, so that the circuit breaker can be used for a higher rating than that of the individual standard poles which make it up.

4,958,136

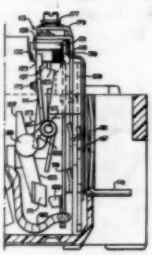
CIRCUIT BREAKER WITH INDIVIDUAL GAP ADJUSTMENT AT HIGH AND LOW SETTINGS OF MAGNETIC TRIP

Alfred E. Maier, Chippewa Township, Beaver County, Pa.; Antonio W. M. Cabral, Ilha do Governador, and Carlos P. S. E. Silva, Rio de Janeiro, both of Brazil, assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 8, 1989, Ser. No. 320,647

Int. Cl.[5] H01H *75/10*

U.S. Cl. 335—42 **9 Claims**



1. A circuit breaker for responding to abnormal currents in a conductor in an electrical system, comprising:

electrical contacts operable between a closed position in which a circuit is completed through the conductor and an open position in which the circuit through the conductor is interrupted;

a latchable operating mechanism operable to open said electrical contacts when unlatched;

a trip bar rotatable from a biased position to a trip position to unlatch said operating mechanism; and

a magnetic trip assembly, comprising:

a stationary magnetic structure;

a movable armature which is attracted to the stationary magnetic structure by an abnormal current through said conductor to rotate said trip bar to the trip position;

spring means biasing said armature away from said stationary magnetic structure to form a gap therebetween;

adjusting means adjusting biasing of said armature by said spring means over a range from a high setting to a low setting and adjusting said gap independently at said high and low settings;

pivot means pivotally mounting said movable armature for rotation about a pivot axis; and

said adjusting means including a sliding member movable rectilinearly generally parallel to said pivot axis to adjust biasing of said armature between said high and low settings, and gap adjustment means carried by said sliding member and including a first selectably extendable projection aligned to selectably bear against said armature and adjust said gap only when said sliding member adjusts biasing of said armature to about said high setting and a second selectably extendable projection aligned to bear against said armature and adjust said gap only when said sliding member adjusts biasing of said armature to about said low setting.

4,958,137

ELECTROMAGNETIC RELAY

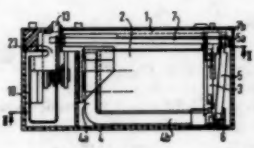
Harry Schroeder, Unterhaching, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 15, 1989, Ser. No. 408,070

Claims priority, application Fed. Rep. of Germany, Oct. 14, 1988, 3835118

Int. Cl.[5] H01H *67/02*

U.S. Cl. 335—128 **9 Claims**



1. An electromagnetic relay comprising:

a base member including a bottom surface forming a terminal side of the relay;

an electromagnetic system mounted on said base member including a coil, a core extending through said coil, and an armature pivotally mounted to extend adjacent one end of said coil and said core;

an actuation element coupled to said armature for transmitting armature movement; and

a contact arrangement mounted to said base member spaced from the other end of said coil and core and including a movable contact coupled at an attack point to said actuation element and fixed contacts, each of said contacts comprising contact legs including contact locations and extending perpendicular to said bottom surface,

the attack point of the coupling of said actuation element to said movable contact being offset laterally with respect to said contact location of said movable contact and in a common plane therewith perpendicular to said bottom surface of said base member so that they lie spaced apart in a perpendicular projection thereof onto said bottom surface.

4,958,138

RESISTIVE POSITION INDICATOR

Jerzy Hawranek, Vargarda, and Karl P. Jakobsson, Alingsas, both of Sweden, assignors to General Engineering (Netherlands) BV, Utrecht, Netherlands

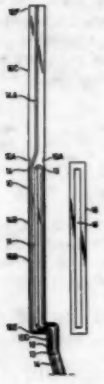
PCT No. PCT/SE87/00283, § 371 Date Apr. 27, 1988, § 102(e) Date Apr. 27, 1988, PCT Pub. No. WO88/00326, PCT Pub. Date Jan. 14, 1988

PCT Filed Jun. 17, 1987, Ser. No. 187,447

Claims priority, application Sweden, Jun. 27, 1986, 8602892

Int. Cl.[5] H01C *10/10*

U.S. Cl. 338—114 8 Claims



1. A resistive position indicator comprising: an insulating substrate; a first area of conductive material on said substrate comprising an elongated resistive element; a second area of conductive material on said substrate comprising an elongated conductor, extending substantially parallel with said resistive element, and being connected thereto at one end; a respective terminal provided at the other end of said resistive element and of said conductor adjacent one end of said substrate; a third elongated area of conductive material on said substrate, extending substantially parallel with said first and second areas and having a terminal at the same end of said substrate as the other terminals; a tap means, connected to said third area, for contacting said resistive element at a contact point which is movable along the resistive element and divides the resistive element into two portions so that the resistance ratio between the two portions of the resistance element can be varied between wide limits, said tap means including an elongated area of low resistivity electrically conducting material which is applied to an insulating supporting substrate, extending parallel to and slightly spaced from said substrate carrying said first, second, and third areas of conductive material, and which has a contact portion positioned in front of, parallel to, and slightly spaced from said resistive element and defining an air gap between said resistive element and said contact portion; and at least one of said substrate and said supporting substrate consisting of a flexible foil so that adjacent points on said contact portion of said tap means and on said resistive element can be brought into contact, and close said air gap between said resistive element and said contact portion, at any point along said resistive element by means of a compressive force on said flexible foil to establish said contact point.

4,958,139

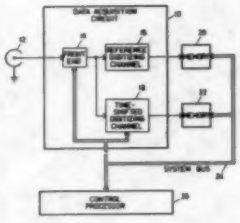
METHOD AND APPARATUS FOR AUTOMATICALLY CALIBRATING THE GAIN AND OFFSET OF A TIME-SHIFTED DIGITIZING CHANNEL

James R. Hyatt, Madison, Wis., assignor to Nicolet Instrument Corporation, Madison, Wis.

Filed Jun. 23, 1988, Ser. No. 210,234

Int. Cl.[5] H03M *7/00*

U.S. Cl. 340—122 28 Claims



1. A time-shifted digitizing channel, disposed in parallel with a reference digitizing channel within a data acquisition circuit of the type which digitizes and stores values of a signal in a first memory via the reference digitizing channel and in a second memory via the time-shifted digitizing channel, which comprises:

(a) sample-and-hold circuit for receiving the signal;

(b) a variable-offset amplifier disposed to receive the signal from the sample-and-hold circuit, the amplifier having an offset input controlled by an offset controller; and

(c) an analog-to-digital converter connected between the variable-offset amplifier and the second memory, the converter having a reference input controlled by a gain controller.

4,958,140

COMPARATOR UNIT FOR DATA DISCRIMINATION

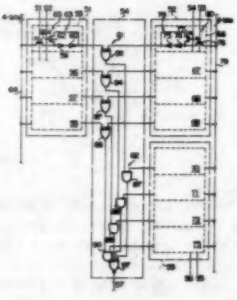
Sadahiro Yasuda, and Yukihiro Nishiguchi, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Mar. 17, 1989, Ser. No. 324,814

Claims priority, application Japan, Mar. 18, 1988, 63-66453

Int. Cl.[5] G06F *7/04*

U.S. Cl. 340—146.2 7 Claims



1. A comparator unit for discriminating a plurality of predetermined input data bit groups from a plurality of input data bit groups, each input data bit group consisting of a plurality of input data bits, comprising:

(a) a first data register operative to store one of said input data bit groups;

(b) a second data register operative to store a reference data

bit group consisting of a plurality of reference data bits and identical in bit string with one of said predetermined input data bit groups;

(c) a third data register operative to store a masking data bit group having at least one mask data bit; and

(d) a comparator circuit having a first logical circuit, a second logical circuit and a third logical circuit, said first logical circuit being operative to compare said one of said input data bit groups with said reference data bit group for producing a consistent data bit group representative of the consistency between the input data bits and the corresponding reference data bits or an inconsistent data bit group representative of the inconsistency between at least a part of the input data bits and the corresponding reference data bits, said second logical circuit being responsive to said masking data bit group and operative to convert said inconsistent data bit group into said consistent data bit group when said part of said input data bits is specified by said mask data bit, said third logical circuit being responsive to said consistent data bit group for producing a detecting signal.

4,958,141

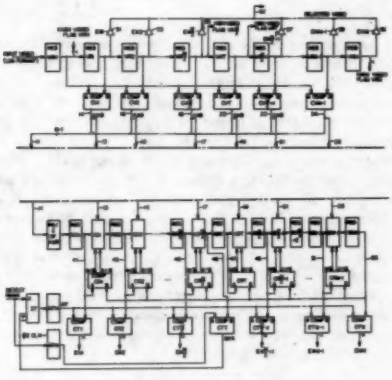
REAL TIME RANK ORDERING LOGIC CIRCUIT

Ronald L. Engelsman, Anaheim, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jul. 15, 1988, Ser. No. 220,138

Int. Cl.[5] G06F *7/02*

U.S. Cl. 340—146.2 **22 Claims**



1. A number ranking circuit for receiving a series of samples and ranking a selected set of said samples by magnitude, comprising:

a plurality of sample register means for receiving said series of samples and for sequentially storing and shifting a selected set of said samples to be ranked such that new samples of said series are sequentially received and stored by said plurality of sample register means containing one of the samples in said set;

means for comparing the magnitude of each sample other than a last received sample in said set to the magnitude of the last received sample and producing a series of outputs;

means for summing said series of outputs to determine the initial rank of said last received sample;

rank register means for storing said initial rank and subsequent ranks assigned to each sample in said set;

means for adjusting the rank assigned to each sample in said rank register means in response to each new sample received by said plurality of sample register means; and

means for determining which of said plurality of sample register means contains a sample of a selected rank.

4,958,142

VEHICLE THEFT DETERRENT

Carol L. Sayers, Glengarry, Miowera Road, North Turramurra NSW, Australia 2074

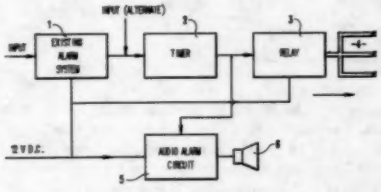
PCT No. PCT/AU88/00450, § 371 Date May 15, 1989, § 102(e) Date May 15, 1989, PCT Pub. No. WO89/05018, PCT Pub. Date Jun. 1, 1989

PCT Filed Nov. 18, 1988, Ser. No. 363,517

Claims priority, application Australia, Nov. 20, 1987, 15534/87

Int. Cl.[5] B60R *25/10*

U.S. Cl. 340—426 **7 Claims**



1. A motor vehicle theft deterrent device for use in a vehicle having an existing electrical vehicle alarm and a sound system component, comprising:

a pressurized cylinder filled with a discomfort causing substance;

a valve for selectively releasing said substance from said cylinder;

a solenoid operatively connected for actuating said valve;

distribution nozzle means connected to said valve for distributing said substance within a vehicle to deter an intruder;

a two-stage timer operatively connected for actuation by said existing vehicle alarm to count first and second predetermined time periods;

an audible alarm operatively connected for actuation by said timer;

relay means operative upon expiration of said first predetermined time period for energizing said solenoid to open said valve, causing release of said substance from said cylinder and simultaneously activate said audible alarm;

said relay means operative to de-energize said solenoid upon expiration of said second predetermined time period to close said valve and stop release of said substance from said cylinder and simultaneously deactivate said audible alarm;

a magnetic proximity switch disposed adjacent said sound system component, said magnetic proximity switch operably connected to energize said solenoid and audible alarm upon movement of said sound system component, causing immediate release of said substance from said cylinder; and

reset switch means operative to disable said two-stage timer prior to expiration of said first predetermined time period.

4,958,143

SYNCHRONIZED PULSE-ENHANCED DUAL LIGHT SOURCE

Robert J. Knauff, Markethouse, Suite 405, 289 E. 5th St., St. Paul, Minn. 55101

Filed Mar. 1, 1989, Ser. No. 317,648

Int. Cl.[5] B60Q *1/44*

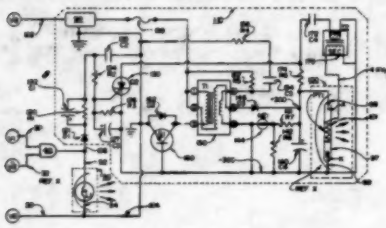
U.S. Cl. 340—479 **19 Claims**

1. Apparatus for enhancing an intermittent low intensity light source that is powered by a drive signal comprising:

a. a high intensity light source optically coupled with said

low intensity light source so that at least some light from both sources is projected in a desired direction, said high intensity light having an instantaneous intensity that significantly exceeds the peak intensity of the low intensity light source; and

b. pulse means connected to said high intensity light source and responsive to said drive signal for pulsing said high



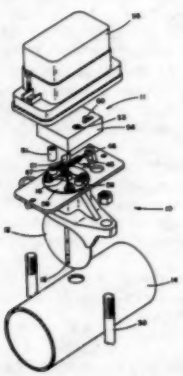
intensity light source to produce a light pulse before the low intensity light source achieves any substantial percentage of its peak intensity, said light pulse occurring in such close time proximity to the peak intensity of the low intensity light source that persistence of vision in the human eye causes the two light sources to blend together visually.

4,958,144

WATER-FLOW DETECTOR

Herbert C. Griess, Lincoln, Nebr., assignor to Pittway Corporation, Northbrook, Ill.

Continuation of Ser. No. 787,311, Oct. 15, 1985, Pat. No. 4,791,414. This application Apr. 15, 1988, Ser. No. 178,018
The portion of the term of this patent subsequent to Dec. 13, 2005, has been disclaimed.
Int. Cl.[5] G09B *21/00*
U.S. Cl. 340—606 **8 Claims**



1. A water-flow detector for detecting a change from a no flow to a flow condition comprising:

a source of radiation;

radiation detector means for producing an electrical output related to the radiation incident upon it in a no flow condition;

pivotable means responsive to said waterflow for interrupting at least a portion of said radiation passing from said radiation source to said detector means in a flow condition; and

means responsive to said electrical output for generating an alarm signal indicative of a flow condition, said means including means for delaying generation of said signal for a sufficient time after said water-flow is detected to avoid nuisance alarms due to transient flow conditions and means for providing said indication upon failure of either said radiation source or said detector means in the no flow condition.

4,958,145

BACK INCLINE INDICATOR

James A. Morris, Milwaukie, Oreg., assignor to Safety Operating Systems, Inc., Lake Oswego, Oreg.

Filed May 5, 1989, Ser. No. 348,212
Int. Cl.[5] G08B *21/00*
U.S. Cl. 340—689 **5 Claims**

1. A back incline indicator for indicating whenever the back of a user is bent beyond an acceptable limit, comprising:

(a) a hollow casing having a side plate,

(b) attaching means on the casing for securing the casing to the back of a shirt collar of a user with the side plate resting against the back of the user,

(c) electric audio signal means in the casing having an electric circuit including a source of electric potential, and

(d) electric tilt switch means in said electric circuit and mounted in said casing for closing said electric circuit and activating said signal means when said casing side plate is disposed in a plane which forms with a vertical line an included angle of a predetermined magnitude and for opening said circuit and deactivating said signal means when said casing side plate is disposed in a plane which forms with a vertical line an included angle of less than said predetermined magnitude.

4,958,146

MULTIPLEXOR IMPLEMENTATION FOR RASTER OPERATIONS INCLUDING FOREGROUND AND BACKGROUND COLORS

Curtis Priem, Fremont; Chris Malachowsky, Santa Clara, both of Calif., and Thomas Webber, Lynn, Mass., assignors to Sun Microsystems, Inc., Mountain View, Calif.

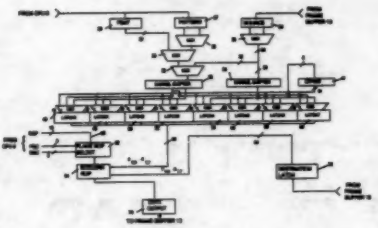
Filed Oct. 14, 1988, Ser. No. 257,853
Int. Cl.[5] G09G *5/40*
U.S. Cl. 340—703 **7 Claims**

1. An apparatus including a central processing unit for generating control signals including background color control signals and foreground color control signals, said apparatus for performing Boolean raster operations on source and destination data for storage in a frame buffer memory for a plurality of planes, said source data being selected from one of a font register, a pattern register and a source block register, said destination data being selected from said frame buffer, said apparatus comprising:

(a) source data select means coupled to said font register,

pattern register and source block register for selecting source data;

(b) plane Boolean raster operation select means coupled to said central processing unit for selecting a Boolean raster operation to be performed for each of said plurality of planes using said foreground color and background color control signals generated by said central processing unit;



(c) Boolean raster operation circuit means coupled to said plane Boolean raster operation select means, said source data select means and said frame buffer for performing the selected Boolean raster operation for each of said plurality of planes on said source data and said destination data for storage in said frame buffer.

4,958,147

GRAPHIC DISPLAY PROCESSING SYSTEM AND DISPLAYED PATTERN PICKING METHOD USED IN THE SAME

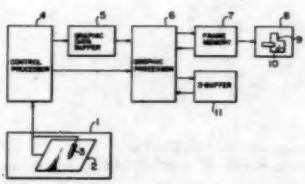
Seiichi Kanema, Yokohama; Misato Nio, Hitachi; Yasushi Fukunaga, Hitachi, and Takehiko Nishida, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 22, 1988, Ser. No. 222,848

Claims priority, application Japan, Jul. 23, 1987, 62-182324

Int. Cl.[5] G09G *5/00*

U.S. Cl. 340—706 **12 Claims**



1. A displayed-pattern picking method used in a graphic display processing system, said system including graphic data buffer means for storing command groups comprising graphic data indicative of display patterns wherein the graphic data includes a display color command and a geometrical form command, an image memory for storing display color data of picture elements displayed on raster-scan type display means, and a graphic processor for reading out the command group from the graphic data buffer means, for calculating display color data corresponding to graphic data within a specified display region, and for writing the calculated display color data in the image memory, said method comprising the steps of:

making a list of specific ones of the display color data stored in the image memory which are included in a specific pattern pick region, by the graphic processor;

comparing display color commands of the graphic data which are successively read out of the graphic data buffer means, with the list by the graphic processor, to select a display color command pattern pick region;

checking whether or not the selected display color command indicates a pattern intersecting with the pattern pick region, by the graphic processor; and,

determining by conventional pick processing whether the geometrical form command associated with the selected display color command comprise graphic data picked for display processing.

4,958,148

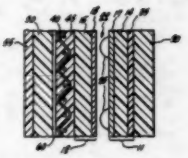
CONTRAST ENHANCING TRANSPARENT TOUCH PANEL DEVICE

Jan B. Olson, Marina del Rey, Calif., assignor to Elmwood Sensors, Inc., Pawtucket, R.I.

Continuation of Ser. No. 715,241, Mar. 22, 1985, abandoned. This application Jan. 22, 1988, Ser. No. 147,627

Int. Cl.[5] G09B *7/00*

U.S. Cl. 340—712 **60 Claims**



1. A contrast enhancing, substantially transparent touch panel device comprising:

(a) a transparent touch panel comprising:

(i) a first transparent, electrically conductive layer;

(ii) a flexible second transparent electrically conductive layer facing, spaced apart from, parallel to, and in close proximity to the first conductive layer, the second conductive layer being selectively displaceable so as to contact the first conductive layer at selected points;

(b) a front transparent, flexible, protective layer; and

(c) an antiglare layer held in place by and embedded within a flexible and transparent adhesive, the adhesive being in liquid form when applied and having been cured in situ, the antiglare layer comprising a flexible and transparent fine mesh microweave screen formed of fine dark-colored filaments.

4,958,149

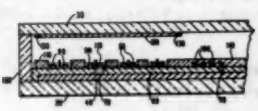
DISPLAY PANEL

Edgar L. Harvey, Jamesburg, N.J., assignor to Telegenix, Inc., Cherry Hill, N.J.

Filed Nov. 20, 1985, Ser. No. 799,822

Int. Cl.[5] G09B *3/14*

U.S. Cl. 340—715 **14 Claims**



1. A display panel comprising an envelope made up of a glass face plate and a glass base plate sealed together hermetically to form an envelope which is filled with an ionizable gas for supporting cathode glow,

a group of cathode segments disposed adjacent to said base plate and adapted to be energized in different combinations to display different characters,

each cathode segment including two cathode members disposed close to and parallel to each other and denoted as first and second bars,

means electrically connecting to a contact pad each cathode bar whereby identical energizing signal sources can be connected to the two cathode bars of each cathode segment so that both bars of a cathode segment can be energized simultaneously to produce a glow along each bar and the glow of one bar blends with the glow of the other bar to produce, in effect, a doubly wide area of cathode glow; or if a first cathode bar of a segment does not turn on and glow, the second cathode bar of the same segment will turn on and glow and provide a correct display, and

anode means disposed in operative relation with said group of cathode segments.

4,958,150

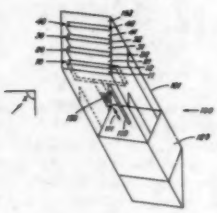
DISPLAY DEVICES AND DISPLAY ELEMENTS THEREOF

Rad H. Dabbaj, Flat 4, 3 Westbourne Crescent, London, United Kingdom W2 3DB

Filed Nov. 18, 1988, Ser. No. 274,230

Int. Cl.[5] G09G *3/34*

U.S. Cl. 340—783 **18 Claims**



1. A display device comprising a plurality of pixels arranged to from a matrix covering an area, and control means for individually setting the properties of each pixel whereby desired information can be displayed over said area, characterised by light reflective pixels which each comprise a plurality of sets of two or more vanes arranged one behind the other with a forward surface of each set visible from the front, the vanes within each set lying in closely adjacent parallel planes, the sets being also parallel but displaced in parallels planes; driving means for conjointly driving a selected group of corresponding vanes in each set, except the foremost, so that the vane forward surfaces are selectively viewable from the front; the vanes in at least one group being colored with a respective plain color which is different from that of the vanes in at least one other group.

4,958,151

DISPLAY CONTROL CIRCUIT

Hiroshi Ushiki, Yokohama, and Tetsuaki Iwasaki, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki and Tosbac Computer System Company Limited, Tokyo, both of, Japan

Filed Aug. 28, 1985, Ser. No. 770,171

Claims priority, application Japan, Sep. 25, 1984, 59-200081

Int. Cl.[5] G09G *3/36*

U.S. Cl. 340—784 **5 Claims**

1. A display control circuit for reducing power consumption comprising:

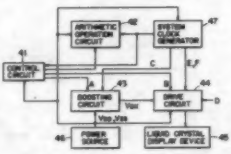
an arithmetic operation circuit for performing a designated arithmetic operation;

a liquid crystal display device;

a drive circuit responsive to results of said arithmetic operation for driving said liquid crystal display device;

a boosting circuit receiving a voltage from a power source, boosting said voltage and supplying the boosted voltage to said drive circuit; and

a control circuit controlling said arithmetic operation circuit and causing interruption of the operation of the boosting



circuit during the period in which said arithmetic operation circuit is carrying out the arithmetic operation,

whereby said control circuit reduces power consumption during the period of said arithmetic operation.

4,958,152

DISPLAY DEVICE AND METHOD OF DRIVING SUCH A DEVICE

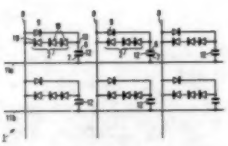
Karel E. Kuijk, and Martinus V. C. Stroomer, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 16, 1988, Ser. No. 208,208

Claims priority, application Netherlands, Jun. 18, 1987, 8701420; Jan. 28, 1988, 8800204; Mar. 22, 1988, 8800704

Int. Cl.[5] G09G *3/36*

U.S. Cl. 340—784 **16 Claims**



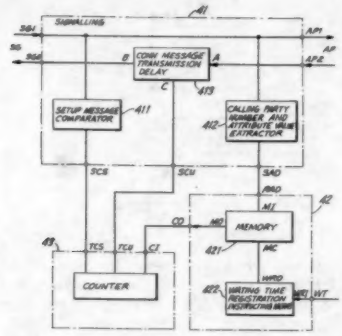
1. A display device comprising an electro-optical display medium between two supporting plates, a system of picture elements arranged in rows and columns, with each picture element being formed by picture electrodes arranged on the facing surfaces of the supporting plates, and a system of row and column electrodes for presenting selection and data signals by means of which a voltage can be presented across the picture elements for the purpose of picture display, at least a first branch arranged between each picture electrode and a row or column electrode and including at least one non-linear switching element, and a second branch arranged between each picture electrode and the row or column electrode and including at least one non-linear switching element which is arranged anti-parallel to the non-linear switching element in the first branch, characterized in that the threshold voltage of the second branch is different from the threshold voltage of the first branch, so that prior to presenting a picture display signal by means of the second branch, the picture elements may be charged or discharged by means of the first branch to a voltage beyond or on the limit of the voltage range to be usaed for picture display.

4,958,153

METHOD AND APPARATUS FOR PRIORITY CONTROL OF INCOMING CALLS AT ISDN TERMINALS

Hatsuho Murata, and Hiroshi Ikeda, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Apr. 6, 1988, Ser. No. 178,131
Claims priority, application Japan, Apr. 8, 1987, 62-84877
Int. Cl.[5] H04Q *1/00*
U.S. Cl. 340—825.5 **4 Claims**



3. A circuit for controlling a priority order in which a terminal connected to an interface of an integrated service digital network (ISDN) answers a SETUP message indicating an incoming call of an ISDN, the circuit comprising:

priority order setting means for establishing a desired priority order, the priority order setting means including a memory storing at least one of waiting time set values, each of the waiting time set values corresponding to a type of a telecommunication service attribute which is given to the terminal of the ISDN;

timer means for timing an interval which begins when the SETUP message arrives at the network and which ends at one of the waiting time set values corresponding to the type of the telecommunication service attribute of an arrived SETUP message; and

signalling processing means for sending an ISDN CONNECT message when said timer means has timed said interval and when the terminal has capabilities to accept the SETUP message.

4,958,154

SYSTEM FOR WIRELESS REMOTE ACTUATION OF DIFFERING SIREN PROGRAMS

Günter Luber; Wolfgang Heuer, both of Hildesheim; Hans O. Maly, Alfeld; Uwe Mätzold, Salzgitter, and Rudolf Messerschmidt, Sibbesse, all of Fed. Rep. of Germany, assignors to Blaupunkt-Werke GmbH, Hildesheim, Fed. Rep. of Germany

Filed Jul. 12, 1989, Ser. No. 378,634
Claims priority, application Fed. Rep. of Germany, Jul. 14, 1988, 3823824
Int. Cl.[5] H04Q *7/00*; G08B *1/08, 27/00*
U.S. Cl. 340—825.690 **7 Claims**

1. System for wireless remote actuation of siren programs, comprising

a siren program unit (1);

an end memory (3) having an output connected to said program unit (1);

a siren buffer memory (4) for storing a siren program to be generated, connected to inputs of said end memory (3);

a first transfer-enable gate (5) having an output connected to a transfer-enable input of said end memory (3);

a comparison circuit (8) having a coincidence output connected to a first input of said transfer-enable gate (5);

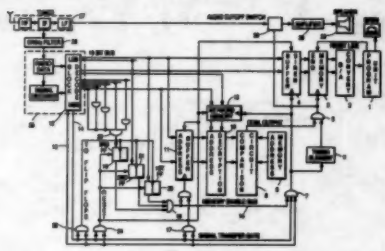
a timing element (6) having an output connected to a second input of said transfer-enable gate (5);

an address memory (9) storing an address characteristic of said siren program unit (1), individually, and having outputs connected to said comparison circuit (8);

an address decryption circuit (10) having outputs connected to said comparison circuit (8);

a block decoder (12) having inputs connected to a source (25, 26, 27) of groups of four blocks of data and outputs connected, via an address buffer memory (11, 31), to a first input of said address decryption circuit (10);

a keyword buffer memory (13) having outputs connected to a second input of said address decryption circuit (10);



a second transfer-enable gate (7), responsive to a fourth one of said data blocks, having an output connected to a transfer-enable input of said siren buffer memory (4) and to a transfer-enable input of said keyword buffer memory (13);

a third transfer-enable gate (17), responsive to a third one of said data blocks, having an output connected to a transfer-enable input of said address buffer memory (11);

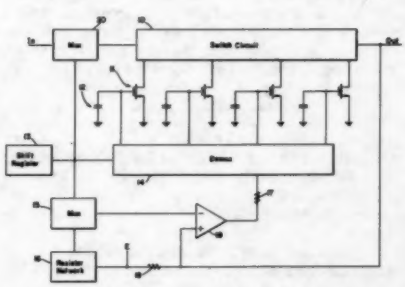
and wherein said source of groups of data words is a remote signal reception means (25, 26, 27).

4,958,155

ULTRA FAST DIGITAL-TO-ANALOG CONVERTER WITH INDEPENDENT BIT CURRENT SOURCE CALIBRATION

Zdzislaw Gulczynski, P.O. Box 441, Winchester, Mass. 01890

Filed Jan. 31, 1989, Ser. No. 304,507
Int. Cl.[5] H03M *1/10, 1/06*
U.S. Cl. 341—120 **18 Claims**



1. Digital-to-analog converter for converting input code into output signal, comprising:

a plurality of capacitive means for storing base signals;

a reference means for providing a reference code and reference signal corresponding thereto;

a multiplexer means for selecting the input code or reference code;

a plurality of current source means for providing the output signal in response to the base signals and to code selected by the multiplexer means;

a comparator means for comparing the output signal against reference signal and providing a corrective signal; and

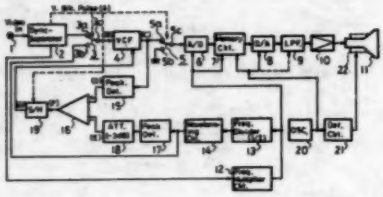
a demultiplexer means for applying the corrective signal to one of the capacitive means in response to the reference code.

4,958,156

A/D CONVERTER CIRCUIT FOR VIDEO SIGNALS HAVING DIFFERENT TIME FREQUENCIES

Naotaka Ando, Saitama, and Shigeto Funado, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 5, 1988, Ser. No. 178,025
Claims priority, application Japan, Apr. 9, 1987, 62-37562
Int. Cl.[5] H03M 1/12
U.S. Cl. 341—123 **7 Claims**



1. An A/D converter circuit comprising:
(a) an input terminal supplied with an input video signal;
(b) a variable filter connected to said input terminal;
(c) A/D converting means connected to said variable filter;
(d) sampling frequency generating means for supplying a sampling signal of a variable frequency to said A/D converting means;
(e) control means for controlling the cutoff frequency of said variable filter in response to the frequency of said sampling signal;
(f) dividing means for producing a divided-frequency signal of said sampling signal;
(g) first switching means connected between said input terminal and said variable filter, said first switching means supplying said divided-frequency signal and said sampling signal to said variable filter during a blanking period of said video signal; and
(h) level comparing means for comparing the levels of the divided-frequency signal and the output signal from said variable filter during said blanking period, said control means being responsive to the output signal of said level comparing means for controlling the cutoff frequency of said variable filter.

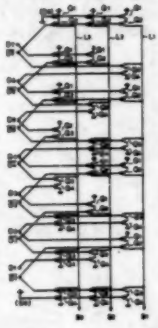
4,958,157

ENCODER CIRCUIT WITH SERIES CONNECTED OUTPUT SWITCHING TRANSISTORS

Takahiro Miki, and Shiro Hosotani, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 14, 1989, Ser. No. 310,112
Claims priority, application Japan, Feb. 15, 1988, 63-33232
Int. Cl.[5] H03M 1/00
U.S. Cl. 341—133 **3 Claims**

1. An encoder circuit for converting a plurality of parallel-supplied input signals into encoded data in the form of a predetermined output signal by sensing a critical level at which the input signal changes between its high and low levels, and supplying the encoded output signal on a plurality of output lines, said encoder circuit comprising:
a plurality of transistor pairs provided between each of said output lines and a source of a predetermined potential level,
each of said transistor pairs comprising
a first transistor which is supplied with an inverted value of one of the two successive input signals in said parallel-supplied input signals; and
a second transistor having the same conductivity type as said



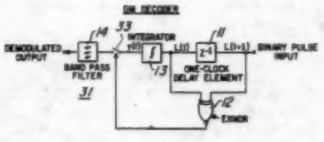
first transistor which is connected in series with said first transistor and is supplied with a non-inverted value of the other of said two successive input signals in said parallel-supplied input signals.

4,958,158

MODEM WITH NOISE-REDUCING DECODER IN DEMODULATION OF ENCODED BINARY PULSE SIGNALS REPRESENTATIVE OF CONSTANT AMPLITUDE SIGNALS

Motomu Hashizume, Ichikawa, and Yukoh Matsumoto, Tsukuba, both of Japan, assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Apr. 21, 1988, Ser. No. 184,318
Claims priority, application Japan, Apr. 22, 1987, 62-99096
Int. Cl.[5] H03M 3/02
U.S. Cl. 341—143 **14 Claims**

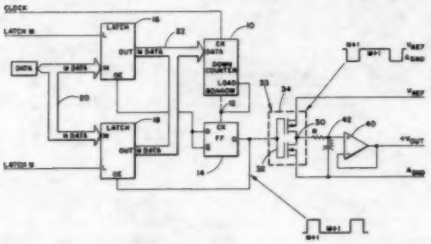


1. A modem comprising:
delta modulation encoder means for receiving an analog input signal and providing an encoded binary pulse signal output; and
delta modulation decoder means operably connected to said encoder means, said decoder means including:
one-clock delay means for receiving the encoded binary pulse signal as an input and delaying said binary pulse signal input one-clock pulse to provide a delayed binary pulse signal as an output therefrom,
logic means having respective inputs connected to the input and to the output of said one-clock delay means for comparing the binary pulse signal input to the delayed binary pulse signal and producing a control signal as an output in response thereto, and
integrator means having an output connected to the output of said logic means and controlled thereby for providing a demodulated output signal from the decoder means in dependence upon a control signal provided by said logic means.

4,958,159
DIGITAL-TO-ANALOG CONVERTER

Michael A. Wyatt, Clearwater, Fla., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 6, 1989, Ser. No. 432,153
Int. Cl.[5] H03M *1/66*
U.S. Cl. 341—144 **8 Claims**



1. A digital-to-analog data convertor comprising:

(a) a first means for storing a first digital word having a first value;

(b) a second means for storing a second digital word having a second value;

(c) means for alternately down counting the first and second stored words responsive to the first and second storage means so as to produce an output waveform having a first pulse component of a first polarity and a second pulse component of an opposite polarity wherein the first and second pulse components have durations proportional to the first and second digital word values;

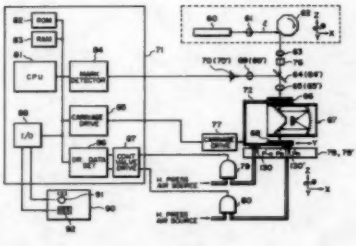
(d) means for inverting the output waveform connected to the down counting means; and

(e) means for supplying an analog output signal proportional to the durations of the first and second pulse components, wherein the supplying means is responsive to the inverted waveform.

4,958,160
PROJECTION EXPOSURE APPARATUS AND METHOD OF CORRECTING PROJECTION ERROR

Yasuaki Ito, Hino; Takehiko Suzuki, and Hirokazu Shimeki, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 30, 1988, Ser. No. 238,196
Claims priority, application Japan, Aug. 31, 1987, 62-215201; Aug. 31, 1987, 62-215202
Int. Cl.[5] G03B *27/42*
U.S. Cl. 355—53 **4 Claims**



1. An exposure apparatus usable with a group of workpieces for moving an original and a workpiece as a unit while irradiating the original with a slit-shaped light, to thereby print a pattern of the original onto the workpiece, said apparatus comprising:

a movable carriage for supporting the original and the workpiece;

a guide mechanism for guiding movement of said carriage;

detecting means for detecting a relationship between marks on the original and corresponding marks on the workpiece while moving said carriage and determining a quantity of adjustment to be made in the attitude of said carriage;

storing means for storing adjustment data representing the quantity of attitude adjustment to be made;

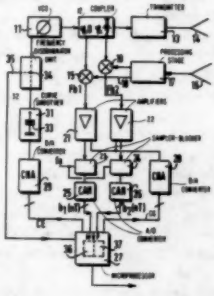
adjusting means for adjusting the attitude of said carriage on the basis of the adjustment data stored in said storing means, wherein said adjusting means cooperates with said guiding mechanism to adjust the attitude during movement of said carriage when printing the pattern of the original onto the workpiece; and

sequence control means for controlling the movement of said carriage when the pattern of the original is going to be printed onto the group of workpieces in sequence, wherein (1) with respect to a predetermined number of workpieces the movement of said carriage is initiated after the quantity of adjustment to be made in the attitude of said carriage is detected by said detecting means, stored into said storing means, and used by said adjusting means to adjust the attitude of said carriage and (2) with respect to the remaining workpieces the movement of said carriage is initiated without further detecting by said detecting means.

4,958,161
FREQUENCY-MODULATED CONTINUOUS-WAVE RADAR ALTIMETER SYSTEM

Roland Allezard, Verrieres le Buisson, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 29, 1989, Ser. No. 374,516
Claims priority, application France, Jul. 1, 1988, 88 08920
Int. Cl.[5] G01S *13/34, 13/36*
U.S. Cl. 342—122 **8 Claims**



1. A radar system of the frequency-modulated type, supplying to a transmit aerial a continuous wave whose frequency f varies almost linearly between a lower frequency f_1 and a higher frequency f_2 so that $f_2-f_1=\Delta f$, comprising a homodyne receiver linked to a receive aerial for supplying a first beat signal fb_1 between transmitted waves and waves received after reflection, suitable for measuring altitude h by measuring the overall phase rotation of the said beat signal Fb_1 for the duration of Δt of each sweep Δf of the transmitted frequency, characterized in that it further includes receive means for producing a second beat signal Fb_2 shifted in phase by $\pi/2$ relative to the first signal Fb_1 as well as digitizing means for sampling the signals Fb_1 and Fb_2 at a rate $1/T$ of the order of several dozen times that of the signals Fb_1, Fb_2 and for converting the latter signals into digital signals $b_1(nT)$ and $b_2(nT)$

respectively, comparing means for comparing at each sample period T the signs of $b_1(nT)$, $b_1[(n-1)T]$, $b_2(nT)$, $b_2[(n-1)T]$ and calculating means for calculating increments on the basis of the said comparisons and deriving, by means of successive increments/decrements during the period Δt, the number of times m, calculated algebraically, that the vector Fb of which Fb_1 and Fb_2 are the components on two perpendicular axes has travelled quarter turns in a given direction of rotation, whilst m is proportional to the altitude to be measured in accordance with the equation:

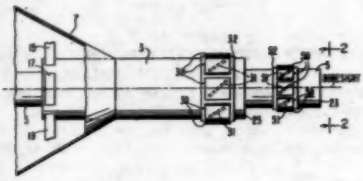
$$h = \frac{mc}{8(f_2 - f_1)}$$

4,958,162

NEAR ISOTROPIC CIRCULARLY POLARIZED ANTENNA

Thomas E. Roberts, Saratoga, and Yeongming Hwang, Los Altos Hill, both of Calif., assignors to Ford Aerospace Corporation, Newport Beach, Calif.

Filed Sep. 6, 1988, Ser. No. 240,665
Int. Cl.[5] H01Q *1/38, 21/20*
U.S. Cl. 343—700 MS **3 Claims**



1. An antenna adapted for circularly polarized electromagnetic energy, comprising:

a first hollow, electrically conductive cylinder elongated along a cylindrical axis and closed at one end thereof by a short circuiting electrically conductive wall, wherein circularly polarized electromagnetic energy propagates within said cylinder;

positioned, generally equispaced circumferentially, around an outer surface of the cylinder at substantially the same axial distance therealong, a plurality of electrically conductive radiating patches each having a curvature that conforms to the curvature of said outer surface;

a dielectric layer juxtaposed between said patches and said outer surface for providing electrical insulation therebetween; and

coupling means situated along said outer surface beneath each patch for coupling electromagnetic energy within the cylinder to each patch and to regions outside the cylinder; wherein

electromagnetic energy outside the cylinder forms a constructive radiation pattern via interaction between the patches and coupling means, so that electromagnetic energy surrounding the cylinder is circularly polarized over a substantial portion of any sphere having a center positioned at the center of said end;

the coupling means comprises an elongated narrow aperture associated with each patch;

each patch has the shape of a rectangular near square; and

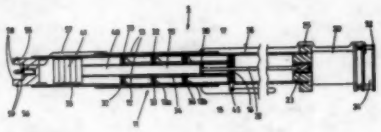
the long axis of each aperture makes nearly a 45° angle with respect to each side of its associated near square rectangular patch.

4,958,163

MEANS FOR TUNING AN ANTENNA

Peter F. Leonard, 11 Cole Street, Klemzig, Australia 5087, assignor to Peter F. Leonard and Leonie A. Leonard, both of Klemzig, Australia

Filed Feb. 1, 1989, Ser. No. 305,292
Claims priority, application Australia, Feb. 1, 1988, PI6518
Int. Cl.[5] H01Q *9/000*
U.S. Cl. 343—745 **7 Claims**



7. An antenna tuning assembly comprising a circular helically wound tuning coil having a curved inner surface, a rod assembly located coaxially within the tuning coil and slidably positionable along a longitudinal axis of the tuning coil,

said rod assembly comprising a support means, at least one resilient wiper means on said support means, said resilient wiper means having an outer surface curved with a same radius of curvature, and in a same plane as the curved inner surface of the tuning coil, the resilience of the wiper means urging the outer surface of the wiper means to conform with, and into contact with a plurality of points of contact extending around a circumference of the curved inner surface of the tuning coil,

wherein the tuning coil comprises a helical winding of wire having at least two wires in parallel helix form along a top portion of a length of the coil and a single helix form along a remaining portion of the coil length, whereby continuous tuning of the antenna tuning assembly can be effected by positioning the wiper along the tuning coil.

4,958,164

LOW PROFILE, BROAD BAND MONOPOLE ANTENNA

John R. Lewis, Jr., Chapin, S.C., assignor to Shakespeare Company, Newberry, S.C.

Continuation of Ser. No. 849,884, Apr. 9, 1986, Pat. No. 4,890,116. This application May 15, 1989, Ser. No. 351,652
The portion of the term of this patent subsequent to Dec. 26, 2006, has been disclaimed.
Int. Cl.[5] H01Q *9/00*
U.S. Cl. 343—749 **2 Claims**

1. A low-profile, monopole antenna operable over a predetermined broad band and connected to a transmission line, comprising:

a radiator including means for providing a series capacitance;

network means for substantially coupling and matching the impedance of the antenna with the impedance of the transmission line to which it is connected, said network means operatively connected to said radiator; and,

resistance means for minimizing the antenna's voltage standing wave ratio (VSWR) over lower frequencies in said broad band to make tuning unnecessary and gain approximate that of a one-quarter wavelength monopole over substantially all frequencies in said broad band, said resistance means electrically connected in series with said radiator.

4,958,165

CIRCULAR POLARIZATION ANTENNA

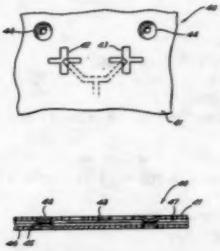
Walter J. Axford, Chalfont St. Peter, and Satwinder S. Chana, Hayes, both of England, assignors to Thorn EMI plc, London, England

Filed Jun. 9, 1988, Ser. No. 204,562

Claims priority, application United Kingdom, Jun. 9, 1987, 8713489; Jun. 23, 1987, 8714717; Oct. 28, 1987, 8725249; Nov. 6, 1987, 8726082; Dec. 7, 1987, 8728534

Int. Cl.[5] H01Q *13/00*

U.S. Cl. 343—770 **2 Claims**



1. An antenna comprising an antenna element having; an electrically conductive front plate having at least one slot, which slot comprises at least one pair or orthogonal slots of differing dimensions to provide transfer of circularly-polarised signals through the said slots; a first array of spacer elements on one side of the front plate, said spacer elements comprising indentations of the surface profile of the one side of the front plate such that corresponding protrusions are formed around and aligned with said indentations on the other side of the front plate; an electrically conductive back plate having a second array of spacer elements on one side of the back plate, arranged to correspondingly align with and face towards said first array, a feed conductor arrangement supported on a dielectric substrate placed between said front plate and said back plate to allow pairs of corresponding spacer elements on each of said plates to support said substrate, the feed conductor arranged to be situated intermediate successive spacer elements.

4,958,166

AMPLITUDE MONOPULSE SLOTTED ARRAY

John T. Branigan, Claremont, and Michael W. Wronski, Upland, both of Calif., assignors to General Dynamics Corp., Pomona Division, Pomona, Calif.

Filed Aug. 22, 1988, Ser. No. 196,696

Int. Cl.[5] H01Q *13/10*

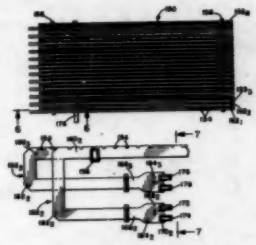
U.S. Cl. 343—771 **12 Claims**

1. A traveling have antenna having a far field antenna of pattern substantially four separate beams, comprising:

a first array of radiating waveguides, each of said first array radiating waveguides having a near end and a far end, with radiating slots formed therebetween;

a second array of radiating waveguides, each of said second array radiating waveguides having a near end and a far end with radiating slots formed therebetween, said first and second array radiating slots interleaved in a planar spaced parallel relationship, the near end of said first array and the near end of said second array lying substantially in a common plane orthogonal to a plane defined by said first and second arrays;

first and second pairs of feed waveguides corresponding to



said first and second arrays of radiating waveguides, each of said feed waveguides having an input end and a load end, and coupled therebetween to the near end of each of said corresponding array of radiating waveguides, each radiating waveguide coupled to a certain one of said feed waveguides being identically coupled to said certain feed waveguide, wherein the energy coupled through each one of said feed waveguides is generally associated with a different one of said separate beans.

4,958,167

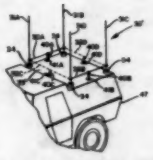
ULTRA-BROADBAND IMPEDANCE MATCHED ELECTRICALLY SMALL COMPLEMENTARY SIGNAL RADIATING STRUCTURES USING THIN WIRE ELEMENTS AND AN IMPEDANCE OPTIMIZING FEED CIRCUIT

Klaus G. Schroeder, 104 County Line Rd., Lansdale, Pa. 19446

Continuation-in-part of Ser. No. 97,522, Sep. 16, 1987, Pat. No. 4,750,000. This application Jun. 7, 1988, Ser. No. 204,085

Int. Cl.[5] H01Q *21/00*

U.S. Cl. 343—853 **7 Claims**



1. An antenna system including an electrically complementary pair element group comprising:

electrically complementary pair elements mounted on a conductive material ground plane; with at least one of said electrically complementary pair elements an equivalent sheet monopole simulated by dual radiating whips; insulation mounting means mounting said dual radiating whips to extend upward away from and insulated from said ground plane; a horizontal feed bar interconnecting said dual radiating whips; signal power feed means connected through opening means is said ground plane to the center portion of said horizontal feed bar interconnecting said dual radiating whips; and hybrid feed circuit means connected to feed signal power to both said elements of said electrically complementary pair elements mounted on said

conductive material ground plane; wherein said electrically complementary pair elements are configured in an endfire complementary element structure, with a set of feed cables leading from the feed hybrid to the front element and to the rear element of said endfire complementary element structure of such average length $(L_1+L_2)/2$ is equal to an optimum number selected to achieve a maximum impedance bandwidth and a minimum mismatch (VSWR) over a maximum frequency range; wherein said optimum average length is every other odd multiple of an eighth of a wavelength such that Lavg. $=(2N+1)\times\lambda o/8$, where N2, 4, 6 etc. and where λo is the wavelength at the center of the band.

4,958,168

INKJET DROP GENERATOR

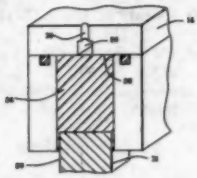
Mark Culpepper, Jonesboro, La., assignor to Ricoh Company, Ltd., Japan and Ricoh Corporation, San Jose, Calif.

Continuation-in-part of Ser. No. 859,480, May 5, 1986, Pat. No. 4,703,330. This application Mar. 19, 1987, Ser. No. 27,869

The portion of the term of this patent subsequent to Oct. 27, 2004, has been disclaimed.

Int. Cl.[5] **G01D** *15/18*

U.S. Cl. 346—75 **6 Claims**



1. A drop generator for causing a plurality of ink streams to break up synchronously into droplets in order that the droplets may be charged and deflected for the purpose of printing, comprising

a nozzle plate comprising a plurality of nozzles spaced along a line from which ink is jetted,

a housing supporting said nozzle plate and defining an acoustic cavity having first and second openings,

a solid material filling said acoustic cavity for transmitting acoustic disturbances from said first opening to said second opening,

disturbance means comprising an acoustic transducer operable at a given frequency to produce said disturbances, said transducer being bonded to said acoustic cavity filling material at said first cavity opening,

means for defining an ink channel across said second opening, said channel receiving said disturbances that are transmitted through said acoustic cavity material, and

means for supplying ink to said ink channel, whereby said disturbances cause said ink in said channel to be synchronously propelled through said openings in said nozzle plate.

4,958,169

FILM HANDLING FOR A LASER RECOkDER

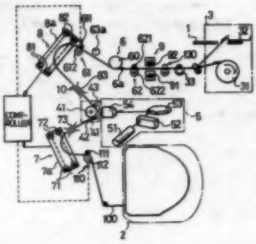
Shuji Mochizuki, Yamanashi; Masayuki Mino, Toyokawa; Yutaka Tanaka, Kawasaki, and Kyoji Tachikawa, Yamanashi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka and Nisca Corporation, Yamanashi, both of, Japan

Division of Ser. No. 41,079, Apr. 21, 1987, Pat. No. 4,814,793. This application Sep. 26, 1988, Ser. No. 248,944

Claims priority, application Japan, Apr. 22, 1986, 61-92865; Apr. 22, 1986, 61-92866; Apr. 26, 1986, 61-97415; Apr. 26, 1986, 61-97416; Apr. 26, 1986, 61-97417; Apr. 26, 1986, 61-97418; Apr. 26, 1986, 61-97419; Apr. 26, 1986, 61-63463

Int. Cl.[5] **G01D** *15/14;* **B41J** *2/47*

U.S. Cl. 346—108 **6 Claims**



1. A laser recorder, comprising:

a film feed unit;

a film take-up unit;

driving means for driving a film drawn out of said film feed unit; and

image information recording means for radiating a laser beam in a width direction of the film that is driven by said driving means;

wherein said driving means comprises:

a main driving roller;

a plurality of pressure rollers for contacting said main driving roller through the film;

a slackened film release mechanism for separating at least one pressure roller from said main driving roller and film for a predetermined time and then contacting the one pressure roller with the film and main driving roller; and

a controller for interlocking a start of said main driving roller with a start of said slackened film release mechanism.

4,958,170

MULTIPLE FILM WIDTH TRANSPORT ADAPTOR

Bernard A. Schwartz; Tommy L. Tew, and Marvin E. Janda, all of Ponca City, Okla., assignors to Conoco Inc., Ponca City, Okla.

Filed Sep. 30, 1988, Ser. No. 251,603

Int. Cl.[5] **G03B** *17/26, 13/14;* **B65H** *19/04*

U.S. Cl. 346—136 **2 Claims**

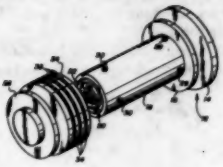
1. A film supply adapter for use in a laser plotter having a cylindrical housing and a film roll holder at each end, said adapter comprising:

a cylindrical assembly having a first end adapted to be removably connected to one of the film roll holders and a second end including a threaded hollow center area;

a rod having an axis and one end threaded for insertion into said threaded hollow center area of said cylindrical assembly;

flange means fixed to the other end of said rod and configured for receiving one end of a film roll; and

a cylinder having o-rings about its circumference adapted to fit tightly against the inside surface of said cylindrical



housing and center hole means for receiving and supporting said rod and permitting axial rotation of said rod.

4,958,171

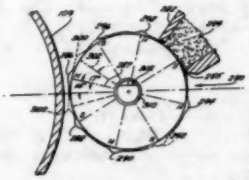
PRINTING APPARATUS AND METHOD

Alfred L. Fulton; Kishor M. Lakhani; Scott D. Sampson, and Kent Lowman, all of Huntsville, Ala., assignors to SCI Systems, Inc., Huntsville, Ala.

Division of Ser. No. 51,046, May 15, 1987. This application Mar. 22, 1989, Ser. No. 327,024

Int. Cl.[5] G01D *15/00*

U.S. Cl. 346—153.1 **4 Claims**



1. A printer for printing vehicular transportation documents said printer comprising, in combination, a print engine, feeder means for feeding document forms to be printed into said print engine, and control means for controlling the printing of vehicular transportation passenger information on said forms by said print engine, in which said print engine includes a drum for receiving and retaining latent electrostatic images, a rotary magnetic toner brush for developing said latent images by producing a plurality of outwardly-extending lobes of toner material, and drive means responsive to said control means for rotating said lobes to a first position in which none is sufficiently near said drum to apply toner thereto in the areas which will not contact any form for printing thereon, and for rotating said lobes to a second position in which at least one lobe is close to said drum so as to develop latent images on areas of the drum which will contact forms.

4,958,172

CHARGE TRANSFER IMAGING CARTRIDGE

Robert S. McCallum, Terra Cotta; Brian McIntosh, Toronto, and Hemant Gandhi, Mississauga, all of Canada, assignors to Delphax Systems, Mississauga, Canada

Filed Aug. 22, 1989, Ser. No. 336,167

Claims priority, application Canada, Apr. 11, 1988, 563828

Int. Cl.[5] G01D *15/00*

U.S. Cl. 346—159 **6 Claims**

1. A charge transfer imaging cartridge comprising:

a dielectric substrate;

first electrodes extending in a first direction along one side of the substrate, said electrodes being continuous and without perforation;

second electrodes extending in a second direction, the second electrodes defining apertures having edges where the first and second electrodes cross; and

a continuous and imperforate dielectric layer separating the first and second electrodes, the layer being of a polymeric material containing particulate filler of a dielectric

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4,958,173

TONER RECEPTIVE COATING

John J. Fitch, Natick; Tim Parker, Shrewsbury; Alfred T. Bouchard, Jr., Blackstone, and Mary Sullivan, Marlborough, all of Mass., assignors to Dennison Manufacturing Company, Framingham, Mass.

Continuation of Ser. No. 376,888, Jul. 6, 1989. This application Nov. 30, 1989, Ser. No. 444,119

Int. Cl.[5] G01D *15/06;* **G03G** *13/20, 19/00*

U.S. Cl. 346—160.1 **23 Claims**

14. A method of transferring a toned image from a dielectric imaging cylinder of an ion deposition printer to a paper substrate wherein dry magnetic toner is employed as the toning medium, comprising the steps of:

(a) applying a toner receptive coating to the paper substrate to form a coated paper substrate,

(b) passing the coated paper between a pressure nip roller and a dielectric imaging cylinder having a toned image thereon, the pressure nip roller operating at a temperature below the softening temperature of the toner whereupon the toned image is transferred to the coated paper substrate,

(c) not exposing the transferred toned image on the paper substrate to a step of heat fusing,

said receptive coating comprising a blend of particulate mineral filler and particulate polymeric wax filler, said receptive coating having the property of causing sufficient adherence of the transferred toned image thereto and sufficient smudge resistance, thus obviating the need to subject the transferred toned image to a step of heat fusing.

4,958,174

DATA RECORDING DEVICE FOR CAMERA

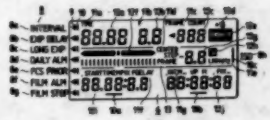
Tetsuro Goto, Funabashi, and Kosho Miura, Yokohama, both of Japan, assignors to Nikon Corporation, Tokyo, Japan

Filed Sep. 5, 1989, Ser. No. 403,295

Claims priority, application Japan, Sep. 6, 1988, 63-117073[U]; Sep. 6, 1988, 63-117074[U]; Sep. 6, 1988, 63-223255

Int. Cl.[5] G03B *17/24*

U.S. Cl. 354—106 **4 Claims**



1. A camera data recording device comprising:

means for setting at least one of a plurality of control modes concerning with a plurality of predetermined camera functions;

means for selecting one mode from a plurality of data recording modes each enabling a selective recording of a plurality of fundamental data when said control mode is not set by said setting means, and selecting one mode from a plurality of setting modes concerning with the setting data associated with said control mode and one mode from said data recording modes when one of a plurality of control modes is set by said setting means; and

means for recording said data on a film in response to said data recording mode or said setting mode.

4,958,175

MOTOR DRIVEN CAMERA

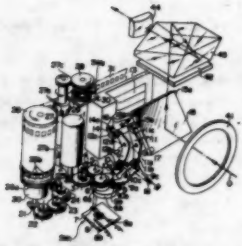
Yasuo Asakura; Toshiyuki Toyofuku, both of Hachioji, and Yuji Imai, Higashiyamoto, all of Japan, assignors to Olympus Optical Co., Ltd., Japan

Filed Feb. 16, 1989, Ser. No. 311,634

Claims priority, application Japan, Feb. 18, 1988, 63-35527; Feb. 18, 1988, 63-35528; Jul. 8, 1988, 63-170251; Aug. 30, 1988, 63-215380

Int. Cl.[5] G03B *1/12*

U.S. Cl. 354—152 **35 Claims**



1. A motor driven camera comprising:

a first motor for performing a film winding operation;

a second motor for performing a shutter charging operation;

control means operable to switch between a concurrent drive mode in which said first and second motors are concurrently driven and a sequential drive mode in which said first and second motors are sequentially driven, the control means choosing the concurrent drive mode subsequent to the completion of a shutter operation;

means for detecting a film winding rate;

switching means for determining that the winding rate detected by the detecting means is below a given rate and for switching the control means to the sequential drive mode if the detected rate is below the given rate;

and sustaining means which is set in accordance with the switching operation of the switching means to maintain the control means in the sequential drive mode when it is set.

4,958,176

DRIVING MOTOR CIRCUIT ARRANGED N COUNTER CIRCUIT FOR CAMERA DEVICE

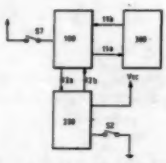
Bon J. Ku, and Hyun W. Jung, both of Changwon, Rep. of Korea, assignors to Samsung Aerospace Industries, Ltd., Changwon, Rep. of Korea

Filed Dec. 6, 1988, Ser. No. 280,503

Claims priority, application Rep. of Korea, Dec. 18, 1987, 8714510

Int. Cl.[5] G03B *1/12*

U.S. Cl. 354—173.11 **8 Claims**



1. A camera device having arranged therein a driving motor circuit for a film automatic transfer device, said driving motor cuircuit including counter circuit means for inputting a frame transfer signal as the film is transferred frame by frame once the back cover of the camera is closed, and for outputting a counter signal until the film is transferred by three frames switch means for outputting a film winding signal in response to at least the counter signal of said counter circuit means; and a driving motor unit for performing film winding and for simultaneously performing film rewinding once the film winding is completed, said driving motor unit including means responsive to the film winding signal for actuating film winding.

4,958,177

ROTATIONAL DRIVE MECHANISM

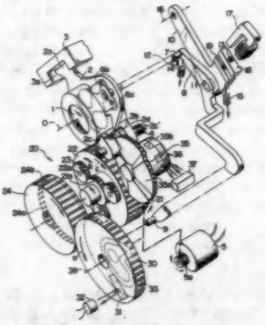
Horoshi Akitake, Hachiojo, Japan, assignor to Olympus Optical Co., Ltd., Japan

Filed Oct. 13, 1988, Ser. No. 257,508

Claims priority, application Japan, Oct. 15, 1987, 62-260891; Nov. 30, 1987, 62-301968

Int. Cl.[5] G03B *1/18*

U.S. Cl. 354—195.1 **33 Claims**



1. A rotational drive mechanism comprising:

a drive source adapted to rotate in either direction;

a differential gearing means driven by the drive source and including a pair of output gears, the differential gearing means operating in a manner such that one of the output gears which carries a smaller load is rotated from the drive source;

a first mechanism designed for rotation in a predetermined

direction and requiring a constant magnitude of drive, the first mechanism being connected to one of the output gears of the differential gearing means;

a second mechanism requiring a drive of varying magnitude during its rotation in either direction, the second mechanism being connected to the other output gear of the differential gearing means, the motion of the second mechanism being inhibited when it carries a load greater than the load applied to the first mechanism or while the first mechanism is being driven;

solenoid means;

a displacement member urged in a direction away from the solenoid means and movable between a position in which it is urged away from the solenoid means, another position in which it is held attracted by the solenoid means and an overcharged position in which it is pressed against the solenoid means beyond the attracted position;

an engaging portion of the first mechanism and located to be in opposing relationship with the displacement member, the engaging portion engaging the displacement member when the latter assumes its attracted position to block the rotation of the first mechanism and being disengaged from the displacement member as it moves away from the solenoid when the solenoid ceases to hold it attracted; and

charging means disposed for abutment against the displacement member to press it to its overcharged position so that the displacement member is firmly held attracted by the solenoid, the charging means being operative when released from abutment against the displacement member to move the displacement member to its attracted position under the urging influence to engage it with the engaging portion.

4,958,178

COLLAPSIBLE MOUNTING TYPE CAMERA WITH ZOOM LENS

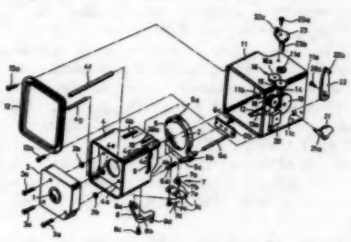
Toshio Yoshida; Masayoshi Hirai; Tetuo Nishizawa, all of Saitama, and Masashi Takamura, Tokyo, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 16, 1988, Ser. No. 272,524

Claims priority, application Japan, Nov. 16, 1987, 62-288839

Int. Cl.[5] G03B *1/18*

U.S. Cl. 354—195.12 **14 Claims**



1. A camera with a zoom lens comprising:

a zoom lens system having at least front and rear lens means having a common optical axis;

a movable lens barrel holding said front lens means and being axially movable rearwardly and forwardly relative to a camera body;

means for causing said axial movement of said movable lens barrel while changing the relative position between said front and rear lens means by cooperatively shifting said rear lens means along said axis relative to said front lens means between first and second positions in both of which positions said rear lens means lies on said axis so as to change said zoom lens system between the longest and the shortest focal length respectively, said causing means permitting said movable lens barrel to be moved rearwardly beyond a position wherein said zoom lens system provides said shortest focal length while maintaining said rear lens means in said second position, thereby allowing said movable lens barrel to retract at least almost fully within said camera body; and

means preventing rotation of said movable lens barrel and said front and rear lens means during said axial movements thereof.

4,958,179

CAMERA WITH CHANGEABLE FOCAL LENGTH

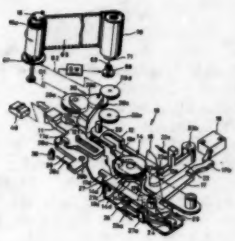
Hiroshi Komatsuzaki; Kazuo Kamata, both of Tokyo; Akio Ohmiya; Syunji Nishimura, both of Saitama; Yoshihito Umeda, Yamanashi; Noriya Mochizuki, Yamanashi, and Eiji Furuya, Yamanashi, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa and Nihon Seimitsu Kogyo Kabushiki Kaisha, Yamanashi, both of, Japan

Filed Dec. 27, 1988, Ser. No. 291,450

Claims priority, application Japan, Dec. 25, 1987, 62-328806; Dec. 26, 1987, 62-198153[U]; Jan. 12, 1988, 63-4445

Int. Cl.[5] G03B *1/18*

U.S. Cl. 354—195.12 **23 Claims**



1. A focal length changeable camera with a taking lens system which is driven by a motor and is changed to provide at least two different focal lengths, namely, relatively long and relatively short, said camera comprising:

a motor switch for turning on and off said motor;

rotatable changing means driven by said motor;

lever displacing means provided on said rotatable changing means;

a motor switching lever engageable with said lever displacing means for switching said motor switch; and

a focal length changing member for changing the focal length of said taking lens system upon rotation of said rotatable changing means.

4,958,180

FOCUS DETECTING DEVICE AND AUXILIARY ILLUMINATING DEVICE THEREFOR

Toru Matsui, and Hiroshi Ueda, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 20, 1988, Ser. No. 196,290

Claims priority, application Japan, May 23, 1987, 62-125027; May 23, 1987, 62-125028; May 23, 1987, 62-125029

Int. Cl.[5] G03B *3/00*; G01J *1/00*

U.S. Cl. 354—403 **10 Claims**

1. Focus detecting device for detecting a focus condition of a photographic lens, comprising:

light receiving means for receiving light coming from a plurality of focus detecting areas through the photographic lens to produce output signals used for detecting the focus condition of the photographic lens, said plurality of focus detecting areas including at least one axial focus detecting area located on an optical axis of the photographic lens and at least one off-axial focus detecting area located away from the optical axis of the photographic lens; and

illuminating means for illuminating the plurality of focus detecting areas, including:

light emitting means for emitting light; and

contrast projecting means for projecting a predetermined projection pattern onto the plurality of focus detecting areas by the light emitted by the light emitting means, including a projecting pattern plate in which the predetermined projection pattern is formed, and a projection lens for projecting the predetermined projection pattern onto the plurality of focus detecting areas, said projection pattern plate being curved in accordance with characterstic of astigmatism generated by the projection lens.

4,958,181

CAMERA SYSTEM

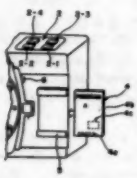
Norio Ishikawa, Osaka; Masaaki Nakai, Krawachinagano; Masayasu Hirano, Nishinomiya; Akihiko Fujino; Hiroshi Ootsuka, both of Sakai; Takeshi Egawa, Osaka, and Kunio Kawamura, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 122,243, Nov. 8, 1987, Pat. No. 4,855,779. This application Nov. 30, 1988, Ser. No. 278,033

Claims priority, application Japan, Nov. 19, 1986, 61-275546; Nov. 19, 1986, 61-275547; Nov. 19, 1986, 61-275548; Nov. 19, 1986, 61-275549; Nov. 19, 1986, 61-275550; Nov. 19, 1986, 61-275551; Nov. 19, 1986, 61-275552

Int. Cl.[5] G03B *7/00*

U.S. Cl. 354—412 **6 Claims**



1. A camera on which an external device, having a data output means for outputting through first electrical terminals data relating to a camera operation mode, is detachably mounted;

the camera comprising;

second electrical terminals adapted to be connected to the first electrical terminals of the external device;

data input means for inputting the data fed from the external device through the first and second electrical terminals;

storage means for storing the data having been input to the data input means; and

control means for controlling and executing the camera operation according to the data stored in the storage means regardless of whether the external device is mounted on the camera or not.

4,958,182

ARRANGEMENT FOR DETERMINING CAMERA SETTING

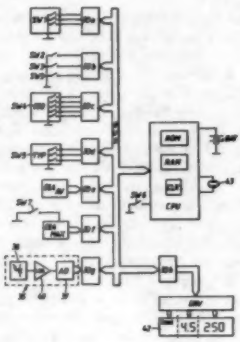
Stig O. Fröberg, and Lars O. Bengtson, both of Göteborg, Sweden, assignors to Victor Hasselblad Aktiebolag, Goteborg, Sweden

Filed Sep. 14, 1988, Ser. No. 244,264

Claims priority, application Sweden, Sep. 15, 1987, 8703554

Int. Cl.[5] G03B *17/18*

U.S. Cl. 354—412 **13 Claims**



1. A camera system including arrangements for determining camera setting comprising a camera housing, a lens provided with an adjustable diaphragm, and a viewfinder, as well as:

central processing means;

digital input/output means and digital bus means for conveying digital address and data signals between the central processing means and the input/output means;

reference point selection means for registering an illumination of a reference portion of a photographic subject;

diaphragm data means for generating first and second diaphragm data signals, and for applying said diaphragm data signals to said central processing means, said diaphragm data means comprising:

(a) first diaphragm setting means for generating said first diaphragm data signals corresponding to a current setting of the adjustable diaphragm;

(b) second diaphragm setting means for generating said second diaphragm data signals corresponding to a maximum possible opening of the diaphragm; and

light-measuring means for measuring light intensity from a chosen measurement portion of a photographic subject, said measurement portion being represented in a measurement field of the viewfinder, for generating electrical light strength signals corresponding to said light intensity, and for applying said light strength signals to said central processing means;

maneuverable development type selection means for generating development data signals corresponding to a plurality of development types, and for applying said development data signals to said central processing means;

means, including a maneuverable film-sensitivity selector, for generating and applying film sensitivity data signals to said central processing means;

display means;

zone selection means for selectively generating zone selection signals and for applying said zone selection signals to said central processing means;

said reference point selection means, said diaphragm data means, said light-measuring means, said means for applying film sensitivity data signals to said central processing means, said display means, and said maneuverable development type selection means, each being electrically connected to said input/output means;

said central processing means including means:

(a) for generating the digital address signals for arbitrary addressing of said input/output means;

(b) for calculating and transferring to said display means, and for displaying:

(i) a calculated shutter speed for representing, upon film exposure and in accordance with a chosen development type, chosen by means of said maneuverable development data type means, a reference portion of the photographic subject, chosen by means of said reference point selection means, in a reference zone, chosen by means of said zone selection means;

(ii) a first zone value corresponding to said reference zone as long as said reference portion is represented in said measurement field, and

(iii) a second zone value corresponding to a comparison zone when a comparison portion, different from the reference portion, of the photographic subject, is represented in said measurement field.

4,958,183

CONTROL DEVICE FOR USE IN A CAMERA SYSTEM

Yasuaki Akada, Sakai; Norio Ishikawa, Osaka; Takeshi Egawa, Sennan, and Nobuyuki Taniguchi, Tondabayashi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 59,579, Jun. 8, 1987, Pat. No. 4,827,299, which is a division of Ser. No. 764,742, Aug. 9, 1985, Pat. No. 4,671,640. This application Feb. 3, 1989, Ser. No. 306,771

Claims priority, application Japan, Aug. 9, 1984, 59-167105; Sep. 6, 1984, 59-187109; Nov. 19, 1984, 59-243994

Int. Cl.[5] G03B *7/00*

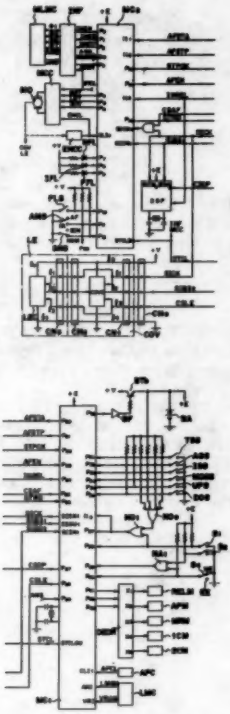
U.S. Cl. 354—412 **3 Claims**

1. A control device for use in a camera, comprising:

first number m of electromechanical converting means for driving mechanisms of the camera, the first number being greater than one;

a microcomputer for carrying out an exposure calculation operation and a sequence control of the camera exposure and having a second number n, which is less than the first number m, of output ports, said microcomputer sequentially determining, with the progress of the sequence control, one of the mechanisms of the camera and outputting from the output ports n bits of control data to cause the corresponding electromechanical converting means to operate, the n bits of control data being a specified code data when no mechanism is necessary to be driven, and

a decoder driver IC to which the first number m of the electromechanical converting means are connected through m number of output signal lines, and which decodes the n bits of control data and selectively drives, based on the decoded data, one of the corresponding electromechanical converting means with the decoded data representing one of the mechanisms to be driven and



none of the electromechanical converting means with the decoded data being the specified data.

4,958,184

DISPLAY DEVICE FOR USE IN A CAMERA

Shuji Izumi, Sakai; Masaaki Nakai, Kawachinagano; Manabu Inoue, Kobe; Akihiko Fujino, Sakai; Kunio Kawamura, Sakai; Yuji Takarabe, Sakai, and Masatake Niwa, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 196,298, May 20, 1988, abandoned, which is a division of Ser. No. 808,251, Dec. 12, 1985, Pat. No. 4,847,651. This application Feb. 9, 1989, Ser. No. 308,991

Claims priority, application Japan, Dec. 14, 1984, 59-264940; Apr. 2, 1985, 60-70619; Apr. 2, 1985, 60-70620; Apr. 2, 1985, 60-70621; Apr. 18, 1985, 60-84197; Apr. 18, 1985, 60-84198; Apr. 23, 1985, 60-88304; Apr. 23, 1985, 60-88305; Apr. 24, 1985, 60-89595; Apr. 24, 1985, 60-89596; Apr. 25, 1985, 60-90217; Sep. 6, 1985, 60-198244

Int. Cl.[5] G03B *17/18, 17/20*

U.S. Cl. 354—474 **9 Claims**

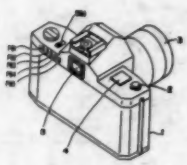
1. A display device for use in a camera provided with a plurality of exposure control modes including a shutter time priority automatic exposure control mode and a diaphragm aperture priority automatic exposure control mode, said display device comprising:

a first display part for displaying a shutter time value;

a second display part for displaying a diaphragm aperture value;

a third display part for indicating the shutter time priority automatic exposure control mode; and

a fourth display part for indicating the diaphragm aperture



priority automatic exposure control mode, said first display part, said third display part, said fourth display part and said second display part being arranged in the order thereof and in a row.

4,958,185

PHOTOGRAPHING APPARATUS

Osamu Kamiya, Machida, and Yasutomo Fujiyama, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

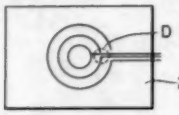
Continuation of Ser. No. 16,994, Feb. 19, 1987, which is a continuation of Ser. No. 851,270, Apr. 10, 1986, which is a continuation of Ser. No. 635,517, Jul. 30, 1984. This application Jun. 7, 1988, Ser. No. 206,987

Claims priority, application Japan, Aug. 3, 1983, 58-142206

The portion of the term of this patent subsequent to Apr. 19, 2005, has been disclaimed.

Int. Cl.[5] G03B *7/099*

U.S. Cl. 354—478 **7 Claims**



1. A photographing apparatus comprising:

an optical system including at least one optical element for forming an image of an object to be photographed on a light-receiving medium;

a plurality of metering photoelectric conversion elements each having a pattern thereon, said photoelectric conversion elements being provided on or in the vicinity of a focal surface of an optical element in said optical system in an optical path through which a light beam from the object is directed to the eye of a user of the photographing apparatus, and the size and shape of the pattern on each of said photoelectric conversion elements being selected so as to be indiscernible to the human eye; and

means for selectively outputting information from said photoelectric conversion elements.

4,958,186

IMAGE RECORDING APPARATUS

Minoru Sashida, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 4, 1988, Ser. No. 190,256

Claims priority, application Japan, May 12, 1987, 62-113468; Jul. 28, 1987, 62-186677

Int. Cl.[5] G03B *27/52*

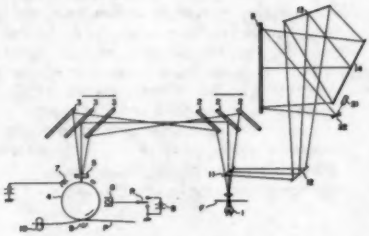
U.S. Cl. 355—41 **9 Claims**

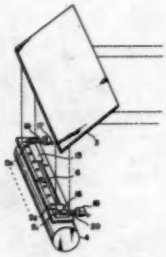
1. An image recording apparatus for recording an image of an image carrier on a recording medium, comprising:

projection means for projecting the image of the image carrier onto a screen;

display means for displaying a light spot at a desired position on the screen;

pressure-responsive position inputting means disposed on the screen, the inputting means, when depressed, providing information corresponding to the location of the depressed position; and





control means for controlling the display means in response to the information provided by the inputting means to display the light spot at a portion on the screen corresponding to the pressed position.

4,958,187

IMAGE FORMING APPARATUS FOR SCANNING BOTH SIDES OF AN ORIGINAL AND PRODUCING A DUPLEX COPY

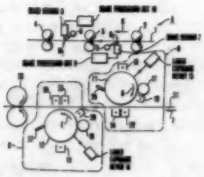
Hiroaki Tsuchiya, and Kimio Nakahata, both of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 9, 1988, Ser. No. 153,919

Claims priority, application Japan, Feb. 13, 1987, 62-029547; Feb. 17, 1987, 62-032351

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—202 **8 Claims**



1. An image forming apparatus capable of forming images on

a first side of a moving transfer member and on a second side thereof reverse to said first side, respectively, comprising:

first image forming means including a first image bearing member, means for forming on the first image bearing member a first toner image corresponding to a first information signal, and first transfer means for transferring said first toner image to the first side of said transfer member at a first transfer station;

second image forming means including a second image bearing member, means for forming on the second image bearing member a second toner image corresponding to a second information signal, and second transfer means for transferring said second toner image to the second side of said transfer member at a second transfer station located on the downstream side of said first transfer station in a moving direction of said transfer member; and

reading means for reading a first side of a moving original to form said first information signal and for reading a second, opposite, side of the moving original to form said second information signal, said reading means being arranged to begin to read the second side of said original at a point of time after another point of time at which reading the first side of said original begins;

wherein the moving speed of said transfer member is different from the moving speed of the original; and

wherein a length of time required by said transfer member to move from said first transfer station to said second transfer station is equal to a length of time between said point of time at which reading said first side of the original begins and said point of time at which reading said second side begins.

4,958,188

IMAGE FORMING APPARATUS WITH ONE RESET SWITCH FOR RESETTING ONE TYPE OF TROUBLE AND A SECOND RESET SWITCH FOR RESETTING A SECOND TYPE OF TROUBLE

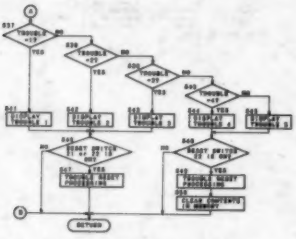
Hirohisa Miyamoto, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Dec. 27, 1988, Ser. No. 290,218

Claims priority, application Japan, Dec. 28, 1987, 62-336321

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—206 **9 Claims**



1. An image forming apparatus comprising:

image processing means including a plurality of discrete operating elements cooperable with one another;

trouble detecting means for detecting trouble occurring in each of said elements;

apparatus stop means for putting said apparatus in an inoperative state when said trouble is detected;

a first switch operable by an operator;

a second switch provided at a different position from said first switch;

discriminating means for discriminating between a first kind of said trouble and a second kind thereof; and

releasing means for releasing said inoperative state in response to said first switch when said first kind of trouble occurs, and for releasing said inoperative state in response to said second switch when said second kind of trouble occurs.

4,958,189

AUTOMATIC EXPOSURE CONTROL SYSTEM OF IMAGE DUPLICATING APPARATUS

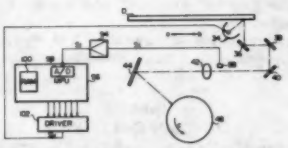
Keiji Yoshida, Aichi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 123,938, Nov. 23, 1987, abandoned. This application Oct. 5, 1989, Ser. No. 418,912

Claims priority, application Japan, Nov. 28, 1986, 61-285386

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—208 **8 Claims**



1. An electrophotographic image duplicating apparatus, a photosensitive recording medium on which images on a document are to be reproduced, optical scanning means of the slot exposure type by which the images on said document are to be scanned by illumination with light and are to be projected onto said recording medium through a predetermined path of light, and an automatic exposure control system which comprises:

(a) detecting means located in said path of light for detecting the density of the images on said document from the intensity of the light reflected from said document and producing a first signal representative of the detected image density;

(b) activating means for activating said scanning means to illuminate said document, said activating means being operable either in a real-time automatic exposure control mode having an illumination value variable on a real-time basis and based on said first signal or in a premonitored automatic exposure control mode in which the illumination value is determined on the basis of said first signal produced while said scanning means is preliminarily scanning said document;

(c) automatic discriminating means for determining whether an adequate response time for variation of the scanning means illumination of the scanned images can be accomplished in accordance with the image density represented by the first signal and for producing a second signal indicative of whether or not said illumination value is adjustable in a real-time automatic exposure control mode, and

(d) control means for controlling said scanning means and said activating means whereby

when said second signal indicates that said illumination value is adjustable in said real-time automatic exposure control mode, said activating means activates said scanning mode, and said real-time automatic exposure control mode, and

when said second signal indicates that said illumination value is not adjustable in said real-time automatic exposure control mode, said activating means activates said scanning means in said premonitored automatic exposure control mode.

4,958,190

IMAGE FORMING APPARATUS

Masazumi Ito, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 243,821, Sep. 13, 1988, abandoned. This application Oct. 18, 1989, Ser. No. 423,698
Claims priority, application Japan, Sep. 14, 1987, 62-230386
Int. Cl.[5] G03G *15/00*
U.S. Cl. 355—228 16 Claims

1. An image forming apparatus which forms a single-colored image on a photoconductive surface and transfers the single-colored image onto a transfer sheet, comprising:

(a) latent image forming means for irradiating said photoconductive surface with information carrying light of a variable intensity for forming latent images on the photoconductive surface,

(b) image developing means comprising at least two developing units of different types each for developing the latent images on said photoconductive surface into visible images,

(c) selecting means for manually selecting one of said developing units,

(d) control means for regulating the intensity of said light depending on the developing unit selected by said selecting means, and

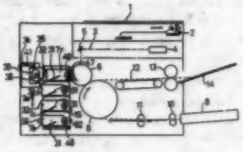
(e) operating means for operating said manually selected developing unit to develop said latent image.

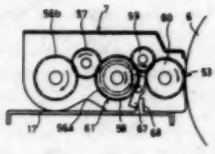
4,958,191

DEVELOPING DEVICE

Takanobu Yamada; Noboyuki Kawai, and Takeru Kinoshita, all of Osaka, Japan, assignors to Minolta Camera Co., Ltd., Osaka, Japan

Filed Mar. 31, 1989, Ser. No. 331,693
Claims priority, application Japan, Apr. 4, 1988, 63-83502
Int. Cl.[5] G03G *15/01, 15/06*
U.S. Cl. 355—245 15 Claims





1. A developing device for developing an electrostatic latent image on an image support member, comprising:

a plurality of developing units for supplying different colored developers to the image support member, each said developing unit having a developing roll which is rotatively driven for supplying the developer to the image support member and a developer stirring means which is rotatively driven for stirring and supplying the developer to the developing roll;

a driving source for rotatively driving the developing roll and the developer stirring means;

a driving force transmitting means provided between the driving source and both the developing roll and the developer stirring means for transmitting a driving force from the driving source to the developing roll and the developer stirring means;

a disconnecting means provided at a transmission part to the developing roll in the driving force transmitting means for disconnecting or connecting only a driving force transmission from the driving source to the developing roll;

a position switching means for switching over positions of each developing unit between a developer supply location adjacent to the image support member and a developer non-supply position away from the image support member; and

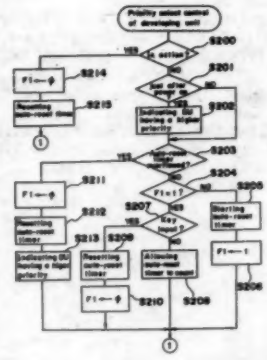
an interlocking means for actuating the disconnecting means to disconnect the driving force transmission when a developing unit is in the developer non-supply position or to connect the driving force transmission when the developing unit is in the developer supply location.

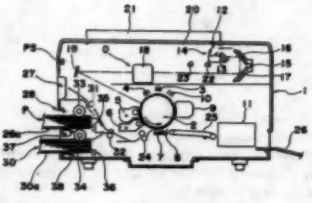
4,958,192

IMAGE FORMING APPARATUS HAVING PLURAL DEVELOPING UNITS AND A DEVICE FOR SELECTING A PREDETERMINED DEVELOPING UNIT

Keiji Kusumoto, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jun. 7, 1988, Ser. No. 202,494
Claims priority, application Japan, Jun. 8, 1987, 62-142931
Int. Cl.[5] G03G *15/06*
U.S. Cl. 355—245 13 Claims





1. An image forming apparatus comprising:

a photoconductor,

first developing means for developing a latent image formed on the photoconductor with first developer,

second developing means for developing a latent image formed on the photoconductor with second developer and

selection means for selecting said first developing means if both of the first and second developers are alike and selecting said second developing means if the first developer and the second one are different from each other when a power supply source for the image forming apparatus is switched on.

4,958,193

MEMBER FOR DEVELOPING ELECTROSTATIC LATENT IMAGES

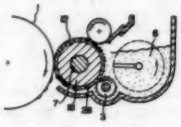
Kazuo Nojima, and Yasuo Hirano, both of Numazu, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Division of Ser. No. 199,868, May 27, 1988. This application Jun. 12, 1989, Ser. No. 364,324

Claims priority, application Japan, May 30, 1987, 62-133438; Nov. 9, 1987, 62-283855

Int. Cl.[5] G03G *15/06*

U.S. Cl. 355—259 **8 Claims**



1. A development apparatus for developing latent electrostatic images to visible images comprising:

a developer holding means for holding a developer comprising a one-component non-magnetic toner;

a development member for developing electrostatic latent images to visible images, comprising:

a support,

a first coating layer, formed on said support, having a volume resistivity of 10^6 to 10^{11} Ω-cm and comprising an elastic material which comprises as a base material a material selected from the group consisting of (i) nitrile rubber, (ii) epichlorohydrin rubber, (iii) a mixture of nitrile rubber and epichlorohydrin rubber, (iv) urethane resin, (v) silicone resin, and (vi) fluoroplastic, and

a second coating layer, formed on said first coating layer, having a volume resistivity of 10^6 to 10^{11} Ω-cm and an elongation ratio of 10% to 50% , and comprising a flexible resin;

a developer supplying means for supplying said developer to said development member; and

a developer layer regulating means for regulating the thickness of a layer of said developer on said development member.

4,958,194

TRANSFERRING DEVICE AND AN IMAGE FORMING APPARATUS

Shozo Kaieda, Hachioji, and Hideo Okajima, Tama, both of Japan, assignors to Kentek Information Systems, Inc., Allendale, N.J.

Filed Feb. 28, 1989, Ser. No. 316,511

Claims priority, application Japan, Jan. 12, 1989, 1-32811

Int. Cl.[5] G03G *15/14*

U.S. Cl. 355—277 **8 Claims**

7. An electrophotographic image forming apparatus of the duplex type capable of forming an image on a first recording surface of a record paper, and an image on a second recording surface of said record paper, comprising

an image forming member;

transfer belt means disposed opposite said image forming member for transferring charged toner from said image forming member onto said record paper;

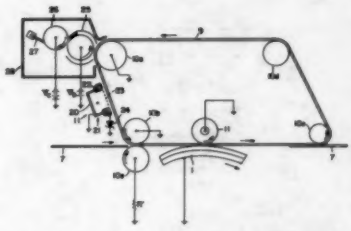
means for driving said transfer belt means in synchronization with said image forming member;

means for pressing said transfer belt means against said image forming member;

corona charging means disposed opposite said transfer belt means for charging said transfer belt means with a charge opposite in polarity to the charge on said toner;

a grid electrode disposed between said corona charging means and said transfer belt means;

first and second biasing sources connectable to said grid electrode for biasing said grid electrode at first and second



potentials respectively, said second potential being larger in absolute magnitude than said first potential; and

change-over circuit means for changing over the connection between said grid electrode and said first and second biasing sources, so that said first biasing source is connected to said grid electrode when said transfer belt means transfers said charged toner onto said first recording surface of said record paper, and so that said second biasing source is connected to said grid electrode when said transfer belt means transfers charged toner onto said second recording surface of record paper.

4,958,195

METHOD AND APPARATUS FOR FUSING ENVELOPES

Rowland V. D. Firth, III; Quay C. Hunter, Jr.; Ronald A. Kohlin, and William W. Sitton, all of Charlotte, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 25, 1989, Ser. No. 398,868

Int. Cl.[5] G03G *15/20*

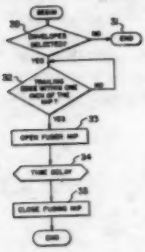
U.S. Cl. 355—290 **26 Claims**

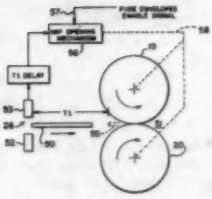
6. A method for fusing xerographic toner to the flat surface of paper or paper-like envelopes by the use of an electrophotographic reproduction device having a pressure fuser, said envelopes being fed through said reproduction device in a manner to have a leading edge and a trailing edge, comprising the steps of

determining if toner images are to be reproduced on envelopes by operation of said reproduction device, and

if toner images to be reproduced on envelopes, releasing the pressure of said pressure fuser after the majority of said envelope extending from said leading edge to said trailing

edge has passed through said pressure fuser, but before the trailing edge of said envelope has passed through said





pressure fuser, to thereby release pressure from said envelope before said trailing edge exits said pressure fuser.

4,958,196

TONER RECOVERY DEVICE

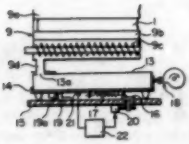
Masaki Fujii; Hitoshi Tamura; Kuninori Suzuki, all of Hachioji, and Noboru Hatakeyama, Sagamihara, all of Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Nov. 8, 1988, Ser. No. 268,414

Claims priority, application Japan, Nov. 10, 1987, 62-282187

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—298 **2 Claims**



1. A toner recovery device, wherein toner on the surface of an image carrying member of an image forming apparatus is removed by a cleaning member and collected in a container, the image forming apparatus including a stationary member having a toner inlet end and an opposite end, the device comprising:

driving means for reciprocatingly moving the container along the stationary member; and

bumper means fixed to the stationary member for colliding with the container when the container moves towards the opposite end for applying negative acceleration to stop the movement of the container.

4,958,197

CLEANING BLADE WITH A SURFACE ACTIVE ANTISTATIC AGENT

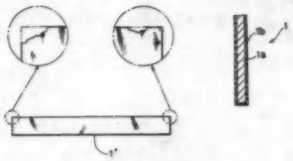
Hiroshi Kinashi, Kyoto; Itaru Kawabata, Kashiwara; Hidenobu Yamane; Yoshiharu Tsujimoto, both of Yamatokoriyama; Shinya Gotoh, Wakayama, and Masayoshi Nawa, Wakayama, all of Japan, assignors to Sharp Kabushiki Kaisha and Kao Corporation, both of Osaka, Japan

Filed Oct. 26, 1988, Ser. No. 262,953

Claims priority, application Japan, Oct. 30, 1987, 62-277041; Oct. 30, 1987, 62-277042

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—299 **14 Claims**



1. A cleaning blade for an image forming apparatus that includes an image-receiving photosensitive surface into contact with which the blade is movable for cleaning toner from the photosensitive surface, said cleaning blade comprising:

a rubber elastomer; and

a surface active antistatic agent forming a unitary part of said blade and disposed for contact with the photosensitive surface when said blade is moved into contact with said photosensitive surface so as to prevent an accumulation of electric charges on said cleaning blade and thereby facilitate maintenance of a layer of toner particles on said blade for imparting to the blade sufficient lubrication to minimize damage to the blade as the blade contacts the photosensitive surface.

4,958,198

AUTOMATIC DOCUMENT FEEDER AND A COPYING APPARATUS EQUIPPED WITH SUCH AN AUTOMATIC DOCUMENT FEEDER

Wataru Hamakawa, Toyokawa, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 328,062, Mar. 23, 1989, Pat. No. 4,914,472, which is a continuation of Ser. No. 184,662, Apr. 21, 1988, which is a division of Ser. No. 95,954, Sep. 14, 1987, Pat. No. 4,831,413. This application Oct. 13, 1989, Ser. No. 421,408

Claims priority, application Japan, Sep. 18, 1986, 61-217954

Int. Cl.[5] G03G *21/00*; G03B *27/32*

U.S. Cl. 355—309 **12 Claims**

1. In a copying apparatus comprising a document feeding means for feeding a document to an exposure station and for discharging the document from the exposure station after exposure, image forming means for forming an image of the document on a copy sheet, sheet feeding means for feeding a copy sheet to the image forming means, and sheet re-feeding means for re-feeding the copy sheet having said image formed thereon to said image forming means, a method for controlling the copying apparatus comprising the steps of:

feeding a first document to said exposure station;

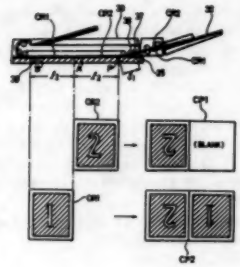
feeding a copy sheet to said image forming means;

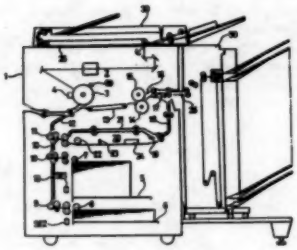
forming said image of the first document on a half area of one surface of the copy sheet;

discharging said first document from the exposure station and feeding a second document to the exposure station;

re-feeding said copy sheet to said image forming means; and

forming an image of the second document on the other half area of said one surface of the copy sheet;





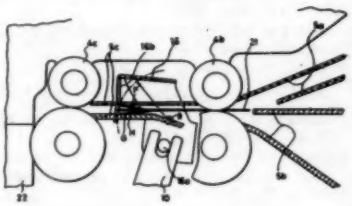
the image of the first document and the image of the second document thereby being formed side by side on said copy sheet.

4,958,199

PRINTING APPARATUS WITH REGISTRATION POSITIONING PLATE

Hideaki Yamashita; Tadashi Hayamizu, and Kiichiro Tanaka, all of Fukuoka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Oct. 19, 1988, Ser. No. 259,825
Claims priority, application Japan, Oct. 20, 1987, 62-264478
Int. Cl.[5] G03G *21/00*
U.S. Cl. 355—317 **2 Claims**



1. A printing apparatus comprising:

(A) a photoconductor;

(B) carrying means for carrying a recording medium by frictional force to said photoconductor in relation to rotation of said photoconductor; and

(C) a positioning plate which is supported to be shifted by a plunger between two positions; a first position being that which temporarily stops carrying of said recording medium for position alignment by touching the edge of said recording medium and a second position being that which allows carrying freely of said recording medium,

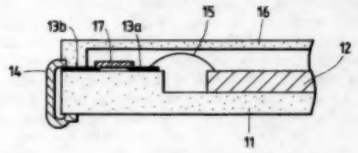
a touching part of said positioning plate to said recording medium is curved as an arc having its axis on the axis of swing of said positioning plate.

4,958,200

OVERCURRENT PROTECTION CIRCUIT FOR SEMICONDUCTOR DEVICE

Takeshi Sekiguchi, Kanagawa, Japan, assignor to Sumotomo Electric Industries, Ltd., Osaka, Japan

Filed Jul. 20, 1988, Ser. No. 221,599
Claims priority, application Japan, Jul. 21, 1987, 62-181553; Jul. 21, 1987, 62-181554; Jul. 21, 1987, 62-181555
Int. Cl.[5] H01L *39/22, 23/48, 23/02*
U.S. Cl. 357—5 **4 Claims**



1. A semiconductor device, comprising:

a semiconductor package;

a semiconductor chip, having electrode pads, disposed inside of said package;

outer terminals disposed on the outside of said package; and

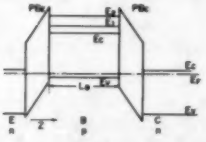
current flow paths electrically connecting said electrode pads with said outer terminals, at least portion of said current flow paths being made of a superconducting material maintained at a temperature lower than the critical temperature of said superconducting material and having a critical current value that is lower than the maximum allowable current value of said semiconductor chip so that the electrical resistance value of said superconducting material will change from zero to a finite value before the maximum allowable current value of said semiconductor chip is reached so as to cause a voltage drop across said superconducting material thus reducing the power dissipated by said semiconductor chip.

4,958,201

RESONANT TUNNELING MINORITY CARRIER TRANSISTOR

Takashi Mimura, Machida, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 722,053, Apr. 11, 1985, abandoned. This application Jun. 5, 1987, Ser. No. 59,216
Claims priority, application Japan, Apr. 17, 1984, 59-075885; Apr. 17, 1984, 59-075886; May 31, 1984, 59-109436
Int. Cl.[5] H01L *29/205, 29/72*
U.S. Cl. 357—16 **39 Claims**



1. A semiconductor device comprising:

an n-type collector region having a conduction band having a first electron energy level;

a collector barrier region formed contacting said collector region, having a thickness capable of allowing tunneling therethrough, having a conduction band having a second electron energy level higher than said first electron energy level;

a base region formed of a semiconductor having a p-type conductivity, formed contacting said collector barrier region, having a base width capable of generating discrete energy levels for minority carriers in said base region, and having a conduction band having a third electron energy level lower than said second electron energy level;

an emitter barrier region formed contacting said base region, having a thickness capable of allowing tunneling therethrough, and having a conduction band having a fourth electron energy level higher than said third electron energy level;

an n-type emitter region formed contacting said emitter barrier region, for supplying minority carriers to said base region through said emitter barrier region and having a conduction band having a fifth electron energy level lower than said fourth electron energy level;

a first potential barrier to said minority carriers existing between said collector region and said base region;

a second potential barrier to said minority carriers existing between said base region and said emitter region; and

bias means for controlling the relative potentials of said emitter and base regions such that said minority carriers are transferred by tunneling from said emitter region via at least one of said discrete energy levels in said base region to said collector region.

4,958,202

SEMICONDUCTOR LIGHT-EMITTING DEVICE AND METHOD OF MANUFACTURING THE SAME

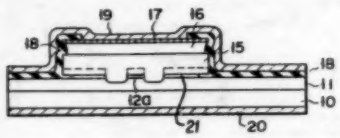
Jun'ichi Kinoshita; Motoyasu Morinaga, both of Yokohama; Hideto Furuyama, Tokyo, and Yuzo Hirayama, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

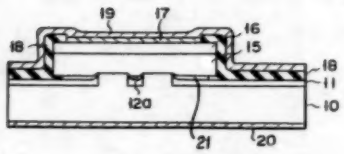
Continuation of Ser. No. 95,114, Sep. 11, 1987. This application Jul. 20, 1989, Ser. No. 382,345

Claims priority, application Japan, Sep. 12, 1986, 61-213800; Sep. 16, 1986, 61-215814; Sep. 30, 1986, 61-231852

Int. Cl.[5] H01L *33/00, 27/14*

U.S. Cl. 357—17 **6 Claims**





6. A semiconductor light-emitting device comprising:

a substrate having a first semiconductor layer of a first conductivity type;

a mesa portion having a second semiconductor layer of a second conductivity type provided above said first semiconductor layer, the first and second semiconductor layers forming two material etched spaces therebetween;

an elongated active region formed between said first and second semiconductor layers and between the material etched spaces, the active region having a predetermined width and comprising a semiconductor having an energy gap narrower than that of said first and second semiconductor layers, and contributing to emission of light;

two elongated semiconductor regions located at both sides in a width direction of said active region and having an energy gap wider than that of the active region, each semiconductor region including an inner surface contacted with the active region, and an etching stop outer surface which defines one side of said material etched space and prevents the active region from being etched away; and

first and second electrodes respectively provided on said substrate and said mesa portion.

4,958,203

HIGH ELECTRON MOBILITY TRANSISTOR

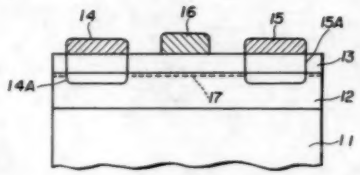
Masahiko Takikawa, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Nov. 2, 1987, Ser. No. 115,925

Claims priority, application Japan, Oct. 31, 1986, 61-258147

Int. Cl.[5] H01L *29/80*

U.S. Cl. 357—22 **4 Claims**



1. A high electron mobility transistor comprising:

a semiinsulating substrate;

an undoped channel layer having an electron affinity, an energy gap and being formed on said semiinsulating substrate, said channel layer comprising an undoped III-IV family compound;

a doped carrier supplying layer formed on said undoped channel layer, said doped carrier supplying layer comprising doped cadmium zinc sulfide (CdZnS) which forms a lattice matching layer with said undoped channel layer an has an electron affinity smaller than that of said undoped channel layer and an energy gap greater than that of said undoped channel layer; and

source, drain and gate electrodes formed on said doped carrier supplying layer.

4,958,204

JUNCTION FIELD-EFFECT TRANSISTOR WITH A NOVEL GATE

Richard A. Blanchard, Los Altos, and Adrian I. Cogan, San Jose, both of Calif., assignors to Siliconix incorporated, Santa Clara, Calif.

Continuation of Ser. No. 112,843, Oct. 23, 1987, abandoned. This application Dec. 21, 1989, Ser. No. 453,367

Int. Cl.[5] H01L *29/80*

U.S. Cl. 357—22 **7 Claims**

1. A junction field effect transistor comprising:

a semiconductor substrate of a first conductivity type;

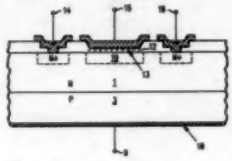
a semiconductor region of a second conductivity type opposite the first conductivity type formed overlying the substrate and having a principal surface;

a source region of the second conductivity type being more

heavily doped than the semiconductor region, and formed in the semiconductor region and extending to the principal surface;

a drain region of the second conductivity type being more heavily doped than the semiconductor region, and formed in the semiconductor region and extending to the principal surface;

an insulating layer including charged ions therein overlying a portion of the principal surface between the source region and drain region;



a first conductive gate electrode overlying the insulating layer; and

a second conductive gate electrode formed on a surface of the semiconductor substrate;

whereby application of a voltage to the first and second conductive gate electrode induces a depletion region in a portion of the semiconductor region underlying the insulating layer.

4,958,205

THIN FILM TRANSISTOR ARRAY AND METHOD OF MANUFACTURING THE SAME

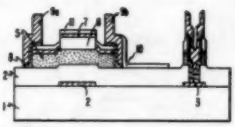
Mamoru Takeda, Hirakata; Ichiro Yamashita, Katano, and Isamu Kitahiro, Yawata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation of Ser. No. 845,120, Mar. 27, 1986, abandoned. This application Apr. 29, 1988, Ser. No. 188,623

Claims priority, application Japan, Mar. 29, 1985, 60-63413; Mar. 29, 1985, 60-63414

Int. Cl.[5] H01L *27/12, 29/78, 23/48*

U.S. Cl. 357—23.7 **5 Claims**



1. A thin film transistor array comprising:

a transparent insulating substrate;

a gate electrode disposed on said substrate and having a predetermined pattern;

a gate insulating layer disposed on said substrate and covering said gate electrode;

a semiconductor layer disposed on said gate insulating layer;

a protective insulating layer disposed on a portion of said semiconductor layer and having a pattern that is the same as that of said gate electrode, the protective insulating layer disposed on said semiconductor layer overlying the gate electrode disposed on the substrate with said patterns thereof aligned;

an impurity-doped semiconductor layer part of which is disposed on said semiconductor layer and part of which is disposed on said protective insulating layer, the part of said impurity-doped semiconductor layer disposed on said semiconductor layer being isolated from the part of said impurity-doped semiconductor layer disposed on said protective insulating layer;

a metal layer disposed on said impurity-doped semiconductor layer; and

source and drain electrodes disposed on said metal layer beside, but not extending into an area directly above a thin film transistor channel portion of the transistor array.

4,958,206

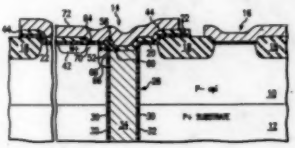
DIFFUSED BIT LINE TRENCH CAPACITOR DRAM CELL

Clarence W. Teng; Robert R. Doering, and Dirk Anderson, all of Plano, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 28, 1988, Ser. No. 212,452

Int. Cl.[5] H01L *29/78, 29/06, 27/12*

U.S. Cl. 357—23.6 **15 Claims**



1. A memory cell formed in a semiconductor layer of a first conductivity type, comprising:

a trench formed into a face of said semiconductor layer, said face substantially planar about said trench;

sidewalls of said trench having a storage insulator formed thereon to define a trench hole;

a conductive capacitor electrode formed in said trench hole and having an upper surface;

a portion of said storage insulator removed from a selected side of said sidewalls to create a gap extending downwardly from said upper surface by a predetermined depth;

a conductive plug formed in said gap to electrically couple said electrode to said semiconductor layer; and

a pass gate transistor, a diffused region of said transistor formed to be of a second conductivity type and formed in said semiconductor layer adjacent said plug.

4,958,207

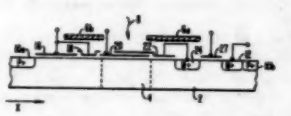
FLOATING DIODE GAIN COMPRESSION

Paul P. Suni, San Mateo, and David D. Wen, Santa Clara, both of Calif., assignors to Loral Fairchild Corporation, Syosset, N.Y.

Filed Mar. 17, 1989, Ser. No. 324,923

Int. Cl.[5] H01L *29/78, 27/14, 31/00;* **G11C** *19/28*

U.S. Cl. 357—24 **15 Claims**



1. Imaging apparatus in a semiconductor substrate comprising:

a mobile charge generation area in said substrate;

an overflow barrier in said substrate adjacent said charge generation area;

an overflow collection area in said substrate adjacent said overflow barrier, said overflow collection area retaining

said overflowed charge and connected to said overflow barrier so that when mobile charge carriers enter the collection area said overflow barrier is adjusted to permit less mobile charge from overflowing said barrier;

a shift register for receiving charge from said mobile charge generation area; and

reset apparatus for draining charge away from said overflow collection area.

4,958,208

BIPOLAR TRANSISTOR WITH ABRUPT POTENTIAL DISCONTINUITY IN COLLECTOR REGION

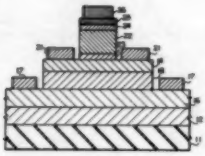
Shin-Ichi Tanaka, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Aug. 8, 1988, Ser. No. 230,592

Claims priority, application Japan, Aug. 12, 1987, 62-202107; Aug. 31, 1987, 62-218820; Dec. 4, 1987, 62-308147

Int. Cl.[5] H01L *29/72*

U.S. Cl. 357—34 **28 Claims**



1. A bipolar transistor comprising:

(a) an emitter region having a first conductivity type;

(b) a base region having a second conductivity type opposite in polarity to said first conductivity type, an emitter-base junction formed between said emitter region and said base region; and

(c) a collector region having a first collector section formed of a first compound semiconductor material and a second collector section formed of a second semiconductor material of said first conductivity type, a base-collector region formed between said base region and said first collector section, an abrupt potential discontinuity formed between said first collector section and said second collector section due to a difference in electron affinity between said first and second compound semiconductor materials, wherein said second semiconductor material is smaller than said first semiconductor material in a bandgap at said abrupt potential discontinuity, said first and second collector section being formed of a non-doped gallium arsenide and an n type indium arsenide, respectively.

4,958,209

VARICAP DIODE STRUCTURE

George H. S. Rokos, Herts, Great Britain, assignor to STC plc, London, England

Filed May 5, 1989, Ser. No. 348,256

Claims priority, application United Kingdom, May 10, 1988, 8810972

Int. Cl.[5] H01L *29/92, 29/06, 29/72, 27/02*

U.S. Cl. 357—34 **2 Claims**

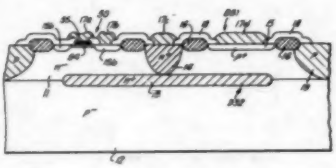
1. An integrated circuit incorporating a varicap diode structure adjacent a polysilicon emitter bipolar transistor in a common device region, the circuit including:

(1) a lightly doped p^--type semiconductor substrate having a lightly doped n^--type epitaxial layer disposed on a major surface thereof,

(2) a heavily doped n^+-type layer disposed between the substrate and the epitaxial layer and providing a buried layer, said buried layer forming a pn junction with the substrate whereby to provide a first varicap diode.

(3) a heavily doped n^+-type sinker extending through the epitaxial layer to the buried layer and providing electrical contact to a central region thereof,

(4) heavily doped p^+-type regions disposed in the surface of the epitaxial layer and each forming a pn junction therewith, one said p^{30}-type region providing a second varicap diode and a further said p^+-type region forming a base contact of the bipolar transistor, said p^+-type regions having been formed simultaneously via a polysilicon mask,



(5) a shallow lightly doped p-type region disposed in the surface of the epitaxial layer and contiguous with the further p^+-type region, said shallow p-type region providing a base of said bipolar transistor,

(6) a polysilicon body disposed on said shallow p-type region and providing the emitter of said bipolar transistor said polysilicon body comprising part of said polysilicon mask, and

(7) a metallisation pattern providing contact to the polysilicon emitter body, the n^+-type sinker and said one and said further p^+-type regions.

4,958,210

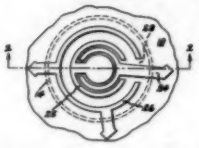
HIGH VOLTAGE INTEGRATED CIRCUITS

Surinder Krishna, Ballston Lake, N.Y.; Manuel L. Torreno, Jr., Richardson, Tex., and Michael S. Adler, Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 514,752, Jul. 18, 1983, abandoned, which is a continuation of Ser. No. 2,378, Jan. 10, 1979, abandoned, which is a continuation of Ser. No. 870,217, Jan. 17, 1978, abandoned, which is a continuation of Ser. No. 703,095, Jul. 6, 1976, abandoned. This application Nov. 20, 1989, Ser. No. 440,457

Int. Cl.[5] H01L *29/72, 27/04, 29/34, 23/48*

U.S. Cl. 357—34 **10 Claims**



1. A monolithic integrated circuit including a semiconductor substrate with an epitaxial layer thereover, said layer having an active semiconductor device formed therein and electrically isolated from other devices in said layer, said active semiconductor device including electrode means insulatingly overlying said layer and conducting a selected region of said active semiconductor device, and a region of higher conductivity than said layer substantially enclosing said selected region except a region of lower conductivity lying substantially directly beneath said electrode means, said electrode means thereby not crossing said higher conductivity region and thereby avoiding premature avalanche breakdown in the semiconductor device of said monolithic integrated circuit upon

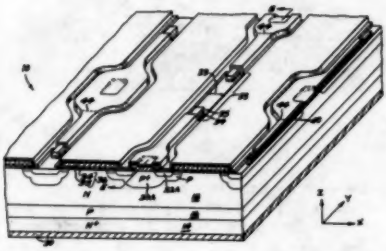
application of bias voltages to said device via said electrode means.

4,958,211

MCT PROVIDING TURN-OFF CONTROL OF ARBITRARILY LARGE CURRENTS

Victor A. Temple, Clifton Park, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Sep. 1, 1988, Ser. No. 239,678
Int. Cl.[5] H01L 29/74
U.S. Cl. 357—38 **39 Claims**



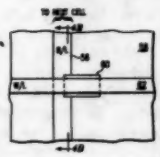
1. A MOS controlled thyristor comprising:
first and second power electrodes;
a body of semiconductor material having first and second opposed major surfaces, said body including:
a first emitter region of one type conductivity extending to said first major surface,
a first base region of opposite type conductivity disposed adjacent to and forming a first PN junction with said first emitter region,
a second base region of said one type conductivity disposed adjacent to and forming a second PN junction with said first base region,
a second emitter region of said opposite type conductivity disposed adjacent to and forming a third PN junction with said second base region, extending to said second major surface of said body and disposed in ohmic contact with said second power electrode,
a source region of one type conductivity disposed within said second emitter region, extending to said second major surface of said body and disposed in ohmic contact with said second power electrode,
said second emitter region including:
a first relatively high doping concentration portion, and
a channel portion having a lower doping concentration, said channel portion being disposed adjacent to said second surface and extending between said source and second base regions;
an insulated gate electrode disposed on said second major surface and extending from said source region to said second base region across said channel portion of said second emitter region for controlling the conduction of one type conductivity carriers through said channel portion of said second emitter region between said source region and said second base region;
said second base region, said channel region and said source region comprising a turn-off FET, said turn-off FET exhibiting a first resistance R_1 between said second base region and said second power electrode; and
a resistor disposed in the current path between said first portion of said second emitter region and said second power electrode, said resistor having a second resistance R_2, $R_2 \geq R_1/10$.

4,958,212

TRENCH MEMORY CELL

Clarence W. Teng, Plano; William F. Richardson, Richardson; Robert R. Doering, Plano; Ashwin H. Shah, Dallas; Bing W. Shen, Richardson, all of Tex., and Mark Bordelon, Melbourne Beach, Fla., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 30, 1988, Ser. No. 292,285
Int. Cl.[5] H01L 29/34, 27/04, 29/78
U.S. Cl. 357—54 **14 Claims**



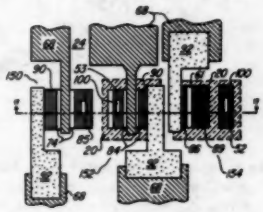
1. A memory cell, comprising:
a semiconductor substrate having a trench formed therein;
a conductor overlying said trench and extending into said trench; and
a conductive region including a linear portion extending primarily tangentially to but not overlapping said trench.

4,958,213

METHOD FOR FORMING A TRANSISTOR BASE REGION UNDER THICK OXIDE

Robert H. Eklund, Plano, and Robert H. Havemann, Garland, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 129,271, Dec. 7, 1987, abandoned. This application Jun. 12, 1989, Ser. No. 366,224
Int. Cl.[5] H01L 29/04, 27/02
U.S. Cl. 357—59 **11 Claims**



1. An integrated circuit structure formed into a semiconductor body, comprising:
an MOS transistor body, comprising:
a source region of a first conductivity type diffused into said semiconductor body;
a drain region of said first conductivity type diffused into said semiconductor body;
a gate dielectric overlying a channel region disposed between said source and drain regions; and
a gate electrode, comprising doped polycrystalline silicon and overlying said gate dielectric; and
a bipolar transistor, comprising:
a collector region of a second conductivity type disposed within said semiconductor body at a distance away from said MOS transistor;
a base region of said first conductivity type disposed within said collector region;

an emitter region of said second conductivity type disposed within said base region;

a base dielectric in contact with said base and emitter regions, the thickness of said base dielectric being greater than the thickness of said gate dielectric of said MOS transistor;

an emitter electrode comprising doped polycrystalline silicon and in contact with said base dielectric, and making contact to said emitter region through a contact via formed through said base dielectric; and

a base contact region of said first conductivity type disposed within said base region, said base contact region having substantially the same depth as said source and drain regions of said MOS transistor and being self-aligned to said emitter electrode; and

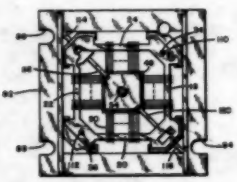
wherein the portion of said emitter electrode in contact with said base dielectric has substantially the same thickness and conductivity as said gate electrode.

4,958,214

PROTECTIVE CARRIER FOR SEMICONDUCTOR PACKAGES

Richard D. Ries, St. Paul; Dewey W. Smith, Fridley, and Spero Payton, Golden Valley, all of Minn., assignors to Control Data Corporation, Minneapolis, Minn.

Filed Apr. 22, 1988, Ser. No. 184,780
Int. Cl.[5] H01L *23/54, 23/12*
U.S. Cl. 357—74 **12 Claims**



1. A carrier assembly for releasably supporting a semiconductor package including a package body and a plurality of leads extended from the body, said carrier assembly including:

a rigid carrier, and a retaining means mounted movably with respect to said carrier for releasably securing a semiconductor package against movement in a longitudinal direction relative to the carrier, with a plurality of electrically conductive leads of said semiconductor package disposed at least proximate a selected surface of said carrier, said leads having end portions remote from a package body of said semiconductor package;

a lead interconnection means, attached to said leads at the end portions thereof, for substantially fixing said end portions with respect to one another; and

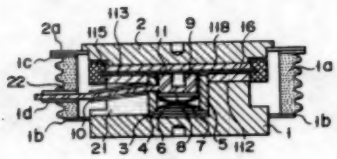
a first registration means integral with said lead interconnection means, and a second registration means integral with said carrier, said first and second, registration means positioned to engage one another to releasably secure said interconnection means against transverse movement relative to said carrier and thereby cooperate with said retaining means to positionally align said end portions of said leads with respect to said carrier.

4,958,215

PRESS-CONTACT FLAT TYPE SEMICONDUCTOR DEVICE

Shinjiro Kojima, Chigasaki; Hideo Matsuda; Masami Iwasaki, both of Yokohama, and Yoshinari Uetake, Sagamihara, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 25, 1989, Ser. No. 384,801
Claims priority, application Japan, Aug. 9, 1988, 63-198558
Int. Cl.[5] H01L *23/42, 23/44, 23/46, 23/48*
U.S. Cl. 357—79 **1 Claim**



1. A press contact flat-type semiconductor device including an anode electrode post, a cathode post and a hollow insulating cylinder sandwiched therebetween, the semiconductor device comprising:

a gate electrode connection section provided on a side of the hollow insulating cylinder;

a disc disposed between the cathode electrode post and the anode electrode post, the disc comprising a metal selected from the group consisting of molybdenum and tungsten;

a pellet disposed between the disc and the cathode electrode post, the pellet including an anode electrode and a cathode electrode located on the anode electrode post and the cathode electrode post, respectively, and a gate electrode disposed on a central portion of the pellet;

a first, relatively thin metal sheet comprising soft copper disposed between the pellet and the cathode electrode post;

a second metal sheet comprising hard copper disposed between the first metal sheet and the cathode electrode post, wherein the anode electrode post, the metal disc, the pellet, the first metal sheet, the second metal sheet and the cathode electrode post are disposed in pressing contact with each other without the respective surfaces thereof being joined;

a gate lead disposed between the cathode electrode post and the gate electrode of the pellet, the gate lead being electrically insluated from the cathode electrode post; and

an elastic body disposed between the cathode electrode post and the gate electrode of the pellet, the gate lead and the elastic body being disposed in pressing contact with each other.

4,958,216

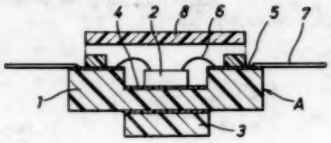
PACKAGE FOR HOUSING SEMICONDUCTOR ELEMENTS

Jun Tanaka; Hitoshi Oikawa; Yoshinobu Kunitomo, and Masami Terasawa, all of Kokubu, Japan, assignors to Kyocera Corporation, Kyoto, Japan

Filed May 24, 1988, Ser. No. 198,111
Claims priority, application Japan, Mar. 23, 1987, 62-69554; May 25, 1987, 62-127398; May 30, 1987, 62-136995
Int. Cl.[5] H01C *23/30*
U.S. Cl. 357—73 **16 Claims**

1. A package for housing at least one semiconductor element, which comprises an insulating substrate having in the interior thereof a cavity for attaching and housing the semiconductor elements and a lid member covering said cavity, wherein the insulating substrate is composed of a mullite sintered body comprising 70 to 95% by weight of mullite and 5 to

30% by weight, as the total content, of silica (SiO_2) and at least one member selected from the group consisting of magnesia (MgO) and calcia (CaO), and SiO_2, MgO and CaO are present in the following composition expressed by % by weight based on the three components:



$100 > SiO_2 \geq 60$,

$40 \geq MgO \geq 0$ and

$40 \geq CaO \geq 0$.

4,958,217

IMAGE PROCESSING APPARATUS AND METHOD CAPABLE OF EXTRACTING A PARTICULAR IMAGE AREA USING EITHER HUE OR BRIGHTNESS

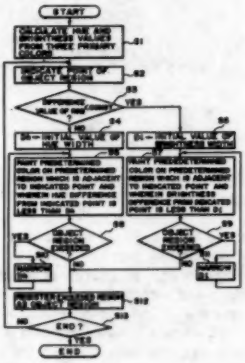
Hiroyuki Kimura; Takeshi Kobayashi, both of Yokohama; Makoto Katsuma, Wako; Kazunobu Urushihara, Inagi; Susumu Matsumura, Yokohama, and Hiroshi Ohmura, Wako, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 17,587, Feb. 24, 1987, abandoned. This application Jul. 27, 1989, Ser. No. 386,004

Claims priority, application Japan, Feb. 27, 1986, 61-040424

Int. Cl.[5] H04N *1/46*

U.S. Cl. 358—75 **24 Claims**



1. An image processing apparatus comprising:

input means for entering color image information;

designation means for designating a particular hue value in said color image information; and

extraction means for extracting an image area from said color image information, based on said particular hue value, said particular hue value being determined from the hue value of a particular position in said color image information.

4,958,218

IMAGE PROCESSING METHOD AND APPARATUS WITH DOT-PROCESSING

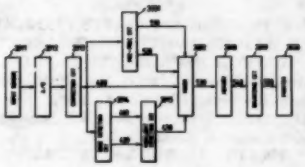
Akihiro Katayama, Kawasaki, and Hidefumi Ohsawa, Urawa, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 15, 1988, Ser. No. 284,603

Claims priority, application Japan, Dec. 16, 1987, 62-319810; Dec. 16, 1987, 62-319811; Dec. 28, 1987, 62-334974

Int. Cl.[5] H04N *1/46*

U.S. Cl. 358—75 **25 Claims**



1. An image processing apparatus comprising:

input means for inputting plural color image data;

first processing means for performing a dotting process on each of the color image data input by said input means such that density data of plural pixels are processed to concentrate a density to a predetermined pixel in a predetermined area consisting of said density data of plural pixels;

second processing means for quantizing the color image data dotting-processed by said first processing means; and

outputting means for outputting a color image obtained by said second processing means,

wherein said first processing means performs the dotting process by changing for each color a position of the predetermined pixel in the predetermined area to which the density is concentrated such that a dot position of each output color image does not overlap with others, and

wherein said second processing means quantizes the color image data in which the density is concentrated on the pixel position in said predetermined area, the pixel position for each color being different from others.

4,958,219

COLOR IMAGE FORMING APPARATUS

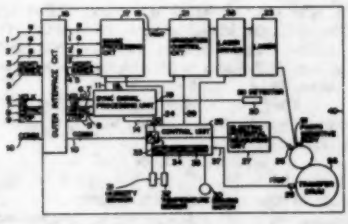
Toshihiro Kadowaki, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 18, 1989, Ser. No. 298,352

Claims priority, application Japan, Jan. 19, 1988, 63-010137

Int. Cl.[5] H04N *1/46*

U.S. Cl. 358—75 **50 Claims**



1. A color image forming apparatus comprising:

(a) input means for entering plural input color component

signals and an output color component control signal, wherein said output color component control signal is input independently of said input color component signals;

(b) process means for processing said plural input color component signals for obtaining plural output color component signals for obtaining plural output color component signals specific to the apparatus; and

(c) control means for controlling the output color component signals from said process means, according to said output color component control signal.

4,958,220

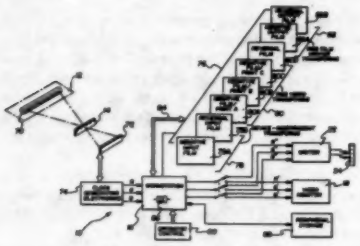
COLOR IMAGING APPARATUS PRODUCING VISUALLY MATCHED DISPLAYS OF PERCEPTUALLY DISTINCT REPRODUCED IMAGES

Paula J. Alessi, Webster; William H. Faul, Pittsford; Edward J. Giorgianni, Rochester; Donald A. Koop, Macedon, and Thomas E. Madden, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 27, 1988, Ser. No. 290,676

Int. Cl.[5] H04N *1/46*

U.S. Cl. 358—76 **6 Claims**



1. In color image reproduction apparatus including a video monitor for displaying a reproduced image to appear on any of a variety of image-receptive output media in which perceptible color of the reproduced image varies from one type of output medium to the next, wherein the improvement comprises:

control means coupled to said video monitor and arranged for manipulating a first set of signals corresponding to an original input image, to produce a second set of signals corresponding to a reproduced image relating to a modification of the original image, said control means further being arranged for showing on said video monitor a series of displays of the reproduced image with each reproduced image shown being visually matched to the reproduced image as it would appear on a particular one of the image-receptive output media.

4,958,221

DIGITAL COLOR COPYING MACHINE COMPRISING A TEST MODE FOR MAKING A COLOR ADJUSTMENT

Toshio Tsuboi; Shigeru Moriya, and Keiji Nakatani, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Nov. 7, 1989, Ser. No. 432,586

Claims priority, application Japan, Nov. 8, 1988, 63-283246; Nov. 8, 1988, 63-283247

Int. Cl.[5] H04N *1/46*

U.S. Cl. 358—80 **26 Claims**

1. A digital color copying machine comprising:

image reading means for scanning an original document image and generating image data;

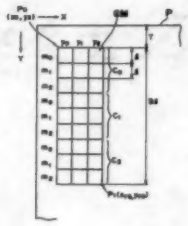
color correcting means for making a color correction for the image data generated by said image reading means;

image forming means for forming the original document image on a recording medium in response to the image data generated by said color correcting means;

area indicating means for indicating a partial area of the original document image;

memory means for storing the image data corresponding to the partial area indicated by said area indicating means;

inputting means for manually inputting the number of test images to be formed; and



control means for controlling said image forming means so as to form plural test images of the indicated partial area of said number having different color balances on said recording medium by reading out said image data stored in said memory means and applying said read out image data to said color correcting means.

4,958,222

SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE

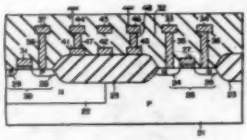
Hiroshi Takakura, Kawasaki; Tetsuya Iida, Yokohama, and Junkei Goto, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 9, 1989, Ser. No. 363,759

Claims priority, application Japan, Jun. 10, 1988, 63-141769

Int. Cl.[5] H01L *25/04, 23/48, 29/52, 29/46*

U.S. Cl. 357—84 **8 Claims**



1. A semiconductor integrated circuit device comprising:

a semiconductor body;

an insulating layer formed on the semiconductor body;

a first conductive layer disposed within the insulating layer;

a first wiring constituting part of the first conductive layer and extending through the interior of the insulating layer in a predetermined direction, the first wiring being used for transmission of a first predetermined signal;

second and third wirings constituting part of the first conductive layer and extending through the interior of the insulating layer in parallel to the first wiring, the second and third wirings being located on respective sides of the first wiring while each being isolated therefrom by a predetermined distance, the second and third wirings for being maintained at first and second predetermined potentials, respectively;

a second conductive layer disposed within the insulating layer;

a fourth wiring constituting part of the second conductive layer and extending through the interior of the insulating layer in parallel to the first wiring, the fourth wiring being

located above the first wiring while being isolated therefrom by a predetermined distance, the fourth wiring being used for transmission of a second predetermined signal;

a fifth wiring constituting part of the second conductive layer and extending through the interior of the insulating layer in parallel to the second wiring, said fifth wiring being located above the second wiring while being isolated therefrom by a predetermined distance, the fifth wire being located on a side of the fourth wiring while being isolated therefrom by a predetermined distance, and the fifth wiring being maintained at a third predetermined potential;

a sixth wiring constituting part of the second conductive layer and extending through the interior of the insulating layer in parallel to the third wiring, the sixth wiring being located above the third wiring while being isolated therefrom by a predetermined distance, the sixth wiring being located on a side of the fourth wiring while being isolated therefrom by a predetermined distance, and the sixth wiring being maintained at a fourth predetermined potential;

a seventh wiring constituting part of the second conductive layer, said seventh wiring being located on a side of the fifth wiring which is opposite to the side where the fourth wiring is located and being isolated therefrom by a predetermined distance, the seventh wiring extending through the interior of the insulating layer in parallel to the fifth wiring and being used for transmission of a third predetermined signal;

an eighth wiring constituting part of the second conductive layer, the eighth wiring being located on a side of the sixth wiring which is opposite to the side where the fourth wiring is located and being isolated from the sixth wiring by a predetermined distance, the eighth wiring extending through the interior of the insulating layer in parallel to the sixth wiring and being used for transmission of a fourth predetermined signal;

a first connecting electrode located between the second and fifth wirings and extending parallel thereto, the first connecting electrode electrically connecting the second and fifth wirings; and

a second connecting electrode located between the third and sixth wirings and extending parallel thereto, the second connecting electrode electrically connecting the third and sixth wirings.

4,958,223

INSPECTION OF CONTAINER FINISH

John W. Juvinall, Ottawa Lake, Mich., and Robert C. Redmond, Toledo, Ohio, assignors to Owens-Brockway Glass Container Inc., Toledo, Ohio

Division of Ser. No. 245,236, Sep. 16, 1988. This application Dec. 11, 1989, Ser. No. 448,531

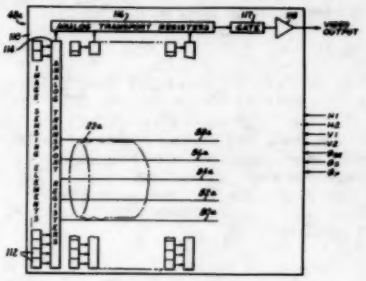
Int. Cl.[5] H04N 5/335

U.S. Cl. 358—106 **12 Claims**

1. A high-speed computer-controlled camera system comprising:

a camera including an image array sensor containing a matrix of CCD image sensing elements arranged in a row-and-column array, a plurality of first transport registers each connected in sequence to sensing elements in one of said rows and responsive to first clock signals for loading information for associated said elements, a second transport register connected to said first transport registers in sequence for receiving image information therefrom, said first transport registers being collectively responsive to second clock signals for loading information into said second transport register corresponding to each column of said image sensing elements in sequence, output means for receiving said information from said second transport register, said second transport register being responsive to third clock signals for transmitting information in sequence to said output means, said output means being responsive to fourth clock signals for providing a video output signal from said sensor, and

image processing means including input means responsive to input control signals for selectively receiving and storing image data in said video output signal, and means for



selectively and independently generating said first, second, third and fourth clock signals and said input control signal for selectively integrating image data by row and column at said sensor, downloading image data from said sensor to said image processing means, and receiving and storing image data at said image processing means.

4,958,224

FORCED CORRELATION/MIXED MODE TRACKING SYSTEM

Robert G. Lepore, Simi Valley; Hannelore G. Hansen, Sepulveda, and Vivien Y. Steinman, Chatsworth, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Aug. 15, 1989, Ser. No. 394,024

Int. Cl.[5] H04N 7/18

U.S. Cl. 358—126 **7 Claims**

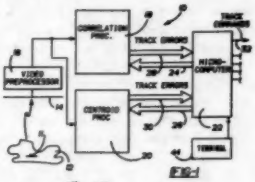


FIG-1

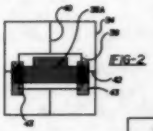
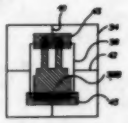


FIG-2



1. A tracking system comprising:

a detector for providing video image signals of a scene containing a target and background clutter;

means for digitizing the video image signals into binary pixels;

a centroid processor capable of generating track error signals along a horizontal and vertical axes as a function of the centroid of objects in the scene;

a correlation processor capable of generating track error

signals along said horizontal and vertical axis as a function of the relative displacement of different images of the scene; and

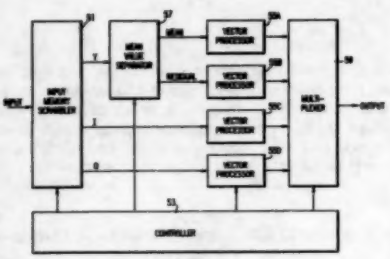
selection means for automatically selecting track error signals from the centroid processor on each axis where the target is contrast bounded, said selection means selecting track error signals from the correlation processor on each axis where the target is not contrast bounded.

4,958,225

FULL-SEARCH-EQUIVALENT METHOD FOR MATCHING DATA AND A VECTOR QUANTIZER UTILIZING SUCH METHOD

Qi Bi, Philadelphia, Pa.; Gardiner S. Stiles, Providence, and Chien M. Huang, Logan, both of Utah, assignors to Utah State University Foundation, Logan, Utah

Filed Jun. 9, 1989, Ser. No. 363,554
Int. Cl.[5] H04N 7/18
U.S. Cl. 358—133 **23 Claims**



23. An apparatus for compressing data in the form of an input vector into an identification code of one of a set of codebook vectors, said apparatus comprising:

(a) input means for receiving the input means for storing the input data vector and for storing codebook vectors,

(b) memory means connected to the input means for storing the input data vector and for storing codebook vectors,

(d) vector procesaor means connected to the memory means for calculating the value of a characteristic measure for an input vector; identifying a reference codebook vector, A_j, having a value of the characteristic measure which satisfies a first criterion; computing a distance, $h_{I,j}$, between the input vector and the reference codebook vector A_j identifying a subset, S, of codebook vectors for which a measure of the codebook vectors satisfies a second criterion with respect to the reference vector; and selecting a codebook vector from the subset S which closely matches the input vector,

(e) output means connected to the vector processor means for generating an output signal representative of the identification code of the closely matching codebook vector.

4,958,226

CONDITIONAL MOTION COMPENSATED INTERPOLATION OF DIGITAL MOTION VIDEO

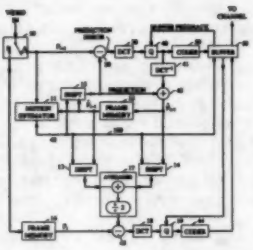
Barin G. Haskell, Tinton Falls, N.J., and Atul Puri, Bronx, N.Y., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Sep. 27, 1989, Ser. No. 413,520
Int. Cl.[5] H04N 7/12
U.S. Cl. 358—136 **12 Claims**

1. A circuit for encoding applied video signals that comprise successive frames, where each frame is divided into blocks, comprising:

first means for encoding the blocks of some of said frames by developing for each block of such frames (a) and approximated version of said block derived from an approximated version of said block developed for a previous frame, and (b) a code which represents the deviation of said block from said approximated version of said block;

second means for approximating the blocks of those of said frames that are to be interpolated by combining approximated versions of said blocks in selected ones of the frames that are encoded in said first means; and



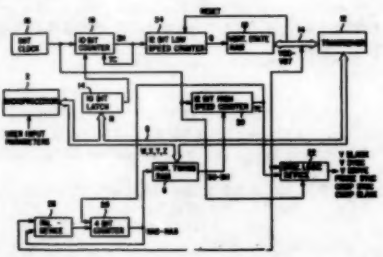
third means responsive to said second means and to said frames to be interpolated for developing a code that corresponds to those pels in blocks approximated by said second means that differ from corresponding pels in said frames to be interpolated by greater than a preselected threshold.

4,958,227

SYSTEM FOR PROVIDING CONTROL SIGNALS FOR RASTER SCAN DISPLAYS

Gary Wan, Waldwick, N.J., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Jul. 17, 1989, Ser. No. 380,413
Int. Cl.[5] H04N 5/04, 5/06
U.S. Cl. 358—148 **16 Claims**



1. A system accessed by a processor means in response to selected input parameters for providing control signals for raster scan displays, comprising:

latch means accessed by the processor means for receiving therefrom a predetermined binary number derived from the total number of dots per horizontal period of the field of a display, and for providing a corresponding signal;

clock means for providing a pulse output in cycles at a predetermined frequency;

first counter means connected to the latch means and to the clock means and responsive to the latch means signal and the clock means pulse output for incrementing the binary number and for providing a signal at a frequency based on the frequency of the pulse output from the clock means;

first memory means accessed by the processor means for

being loaded thereby with a "logical" image of vertical field information for the display;

second memory means accessed by the processor means for being loaded thereby with a plurality of binary counts corresponding to the number of cycles of the clock means pulse output and for providing a corresponding binary count output;

second counter means connected to the first counter means for receiving the signal therefrom as a reference clock input and for providing an output, and connected to the first memory means for sequencing said output through memory locations of said first memory means in predetermined increments, whereby said first memory means provides output data bits containing particular vertical field information for the display;

third counter means connected to the clock means and to the second memory means, and responsive to the pulse output from the clock means and the binary count output from the second memory means for providing outputs at different times; and

means connected to the clock means, the first memory means and the third counter means, and responsive to the clock means pulse output, the first memory means output data bits and the outputs at different times from the third counter means for providing the control signals in a synchronized relationship.

4,958,228

AUTOMATIC FREQUENCY CHANGE DEVICE

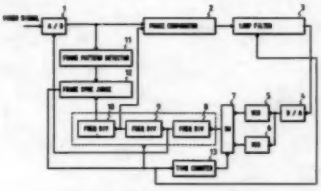
Tetsuo Kutsuki, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jan. 30, 1989, Ser. No. 303,345

Claims priority, application Japan, Oct. 19, 1988, 63-263225

Int. Cl.[5] H04N *5/04, 5/12;* **H03L** *7/00*

U.S. Cl. 358—158 **1 Claim**



1. An automatic frequency change device comprising:

an analog-to-digital converter converting an input analog video signal into a corresponding digital video signal;

a phase comparator having a first input terminal receiving the digital video signal;

a loop filter receiving an output signal from the phase comparator;

a digital-to-analog converter converting an output signal from the loop filter into a corresponding analog control signal;

first and second voltage-controlled oscillators receiving the analog control signal and generating oscillation output signals having different frequencies which depend upon the analog control signal;

a switch receiving the oscillation output signals and selecting and outputting either of the oscillation output signals;

a first frequency divider dividing a frequency of the selected oscillation output signal into a value corresponding to a horizontal frequency, the first frequency divider supplying its output signal to a second input terminal of the phase comparator;

a second frequency divider dividing a frequency of the output signal from the first frequency divider into a value corresponding to a frame frequency;

means for extracting a frame pattern signal from the digital video signal; and

change means for comparing the frame pattern signal of the digital video signal and the output signal from the second frequency divider, detecting whether or not the output signal from the second frequency divider remains out of synchronization with the digital video signal for a time equal to or longer than a reference time, and controlling the switch to change the selected oscillation output signal from one to the other when the output signal from the second frequency divider remains out of synchronization with the digital video signal for a time equal to or longer than the reference time.

4,958,229

METHOD AND DEVICE FOR THE AREA ENLARGEMENT OF A TELEVISION PICTURE

Jean-Claude Guillon, Erstein, and Jean-Claude Rufray, Mittelhausbergen, both of France, assignors to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen, Fed. Rep. of Germany

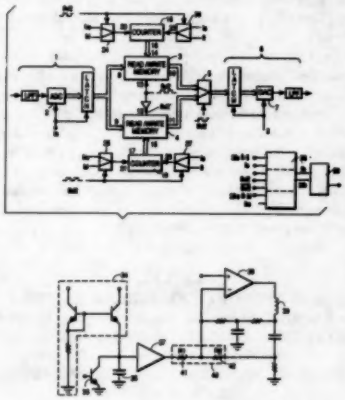
PCT No. PCT/EP88/00569, § 371 Date Feb. 23, 1989, § 102(e) Date Feb. 23, 1989, PCT Pub. No. WO89/00369, PCT Pub. Date Jan. 12, 1989

PCT Filed Jun. 30, 1988, Ser. No. 328,360

Claims priority, application Fed. Rep. of Germany, Jul. 4, 1987, 3722172

Int. Cl.[5] H04N *3/22*

U.S. Cl. 358—180 **8 Claims**



1. A method for expanding an area of an image represented by a television signal including horizontal lines defining a first dimension and a sequence of horizontal lines defining a second dimension, said method comprising:

writing into memory means, signal representing a horizontal line of said television signal;

reading said memory at a rate such that a portion of signal representing less than a complete horizontal line occupies a time interval corresponding to a complete horizontal line;

selectably generating a vertical deflection signal having an amplitude in excess of an amplitude for normally displaying a television signal on a display means;

applying said generated vertical deflection signal to deflection coils of said display means; and

applying signal read from said memory means to a signal input of said display means.

4,958,230

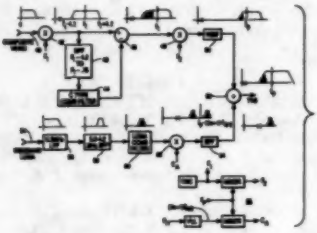
METHOD OF TRANSMITTING AUXILIARY INFORMATION IN A TELEVISION SIGNAL

Krishnamurthy Jonnalagadda, Plainsboro; James J. Gibson, and Theodor M. Wagner, both of Princeton, all of N.J., assignors to General Electric Company, Princeton, N.J.

Filed Aug. 11, 1989, Ser. No. 392,820

Int. Cl.[5] H04N *7/00*

U.S. Cl. 358—186 **14 Claims**



1. Apparatus for augmenting a television signal having information occurring at a horizontal line rate f_H, with an auxiliary signal, said apparatus comprising:

respective means for providing a video signal and an auxiliary signal;

means for providing a picture carrier of frequency f_p;

means responsive to said picture carrier and said video signal for generating a vestigial sideband modulated RF video signal;

means responsive to said picture carrier and said auxiliary signal for generating an RF auxiliary signal having an RF carrier outside of the frequency spectrum occupied by said vestigial sideband modulated RF video signal, and having a sideband representing said auxiliary signal, occurring in the frequency spectrum occupied by the vestigial sideband of said vestigial sideband RF video signal; and

means for including said sideband of said RF auxiliary signal exclusive of said RF carrier, in the vestigial sideband spectrum of said RF video signal.

4,958,231

ELECTRO-OPTICAL STREAK CAMERA

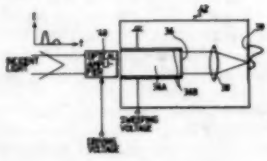
Yutaka Tsuchiya, Shizuoka, Japan, assignor to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan

Filed May 12, 1989, Ser. No. 351,159

Claims priority, application Japan, May 13, 1988, 63-116734

Int. Cl.[5] H04N *5/30*

U.S. Cl. 358—211 **22 Claims**



1. An electro-optical streak camera for measuring a light signal comprising:

an optical amplifier for amplifying the light signal under measurement to provide an amplified light signal;

an electro-optical deflector for deflecting the amplified light signal; and

means for detecting the deflected light signal.

4,958,232

PROCESS APPARATUS FOR PROCESSING MEMORY WHICH STORES INFORMATION

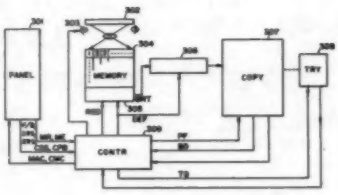
Susumu Sugiura, Yamato; Tadashi Sato, Kokubunji, and Norio Nakajima, Hachiohji, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 159,547, Feb. 22, 1988, abandoned, which is a continuation of Ser. No. 45,233, May 4, 1987, which is a continuation of Ser. No. 910,785, Sep. 23, 1986, abandoned, which is a continuation of Ser. No. 842,712, Mar. 19, 1986, abandoned, which is a continuation of Ser. No. 775,116, Sep. 12, 1985, abandoned, which is a continuation of Ser. No. 706,974, Mar. 1, 1985, abandoned, which is a continuation of Ser. No. 586,646, Mar. 7, 1984, Pat. No. 4,505,576, which is a continuation of Ser. No. 390,025, Jun. 18, 1982, which is a continuation of Ser. No. 201,537, Oct. 28, 1980, abandoned. This application Jun. 21, 1989, Ser. No. 369,619

Claims priority, application Japan, Oct. 30, 1979, 54-140783

Int. Cl.[5] G03G *15/00*

U.S. Cl. 358—300 **32 Claims**



1. An image processing apparatus for handling a memory capable of storing a plurality of image informations comprising:

(a) storage means for causing said memory to store the image informations as page information;

(b) read out means for sequentially reading out and outputting the page information stored in said memory therefrom; and

(c) control means for controlling said storage means and said read out means so as to provide control such that plural pages of image information are stored in said memory means and the plural pages of image information stored in said memory are sequentially read out therefrom,

wherein said control means comprises:

(A) counting means for sequentially counting the number corresponding to the pages of the image information stored by said storage means;

(B) second storage means for storing the number counted by said counting means; and

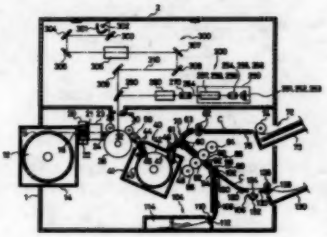
(C) read out control means for providing control such that read out of the plural pages of image information stored in said memory is performed based on the number stored in said second storage means so as to sequentially read out the plural pages of image information stored in said memory therefrom at the time of read out from said memory by said read out means.

4,958,233

DIGITAL AND ANALOG IMAGE RECORDING APPARATUS

Yoshiharu Okino, Kanagawa, Japan, assignor to Fuji Photo Film Col, Ltd., Kanagawa, Japan

Filed Apr. 15, 1988, Ser. No. 181,953
Claims priority, application Japan, Apr. 15, 1987, 62-90646
Int. Cl.[5] G01D *15/14*; H04N *1/21*; G03B *41/00*
U.S. Cl. 358—302 8 Claims



1. An image recording apparatus, comprising:

a photosensitive material developable into three colors;

an analog exposure unit comprising a source of visible light directed at an original and a first set of optics for directing light reflected from said original to said photosensitive material; and

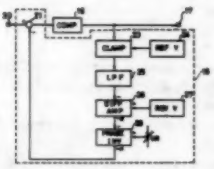
a digital exposure unit comprising first and second respective light sources, individually modulated by first and second image signals, and respectively emitting modulated first and second beams of infrared radiation in first and second wavelength bands and a second set of optics for combining and directing said first and second beams to said photosensitive material, wherein said photosensitive material is developable into first and second colors in response to application of said first and second wavelength bands of said first and second beams, respectively, and wherein said light reflected from said original and said first beam simultaneously irradiate said photosensitive material.

4,958,234

DISTORTION ELIMINATING CIRCUIT

Hirohisa Yamaguchi, Tokyo, and Akira Mashimo, Tokorozawa, both of Japan, assignors to Teac Corporation, Japan

Filed Oct. 18, 1988, Ser. No. 259,152
Claims priority, application Japan, Oct. 21, 1987, 62-265555
Int. Cl.[5] H04N *9/87*
U.S. Cl. 358—327 9 Claims



1. A distortion eliminating circuit for eliminating a harmonic distortion from an input frequency modulated signal containing the harmonic distortion comprising:

comparator means supplied with said input frequency modulated signal and for producing a signal of output pulses corresponding to the input frequency modulated signal containing the harmonic distortion by shaping the input frequency modulated signal on the basis of comparison with a predetermined reference voltage;

smoothing means supplied with said output pulses from the comparator means for obtaining a d.c. output signal having a level corresponding to an average level of said output pulses by filtering the output pulses of the comparator means;

detection means supplied with said d.c. output signal from the smoothing means and detecting a d.c. component corresponding to the harmonic distortion in said frequency modulated signal; and

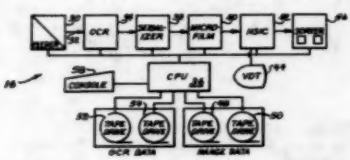
mixing means supplied with said d.c. component and further with said input frequency modulated signal for producing second frequency modulated signal having an adjusted level by mixing said d.c. component to the input frequency modulated signal and for supplying said second frequency modulated signal to said comparator means, said comparator means being supplied with said second frequency modulated signal and producing a second output pulses from which the effect of the harmonic distortion is eliminated.

4,958,235

SYSTEM AND METHOD FOR RAPIDLY CONVEYING DOCUMENT IMAGES BETWEEN DISTANT LOCATIONS

Richard L. Sims, London; Billy S. Baker, Corbin; Randy G. Dotson; Robert J. York, both of Somerset, and Joey A. Herrell, London, all of Ky., assignors to Appalachian Computer Services, London, Ky.

Filed Jan. 5, 1989, Ser. No. 293,923
Int. Cl.[5] H04N *1/00*
U.S. Cl. 358—402 30 Claims



1. A system for rapidly conveying the images contained on each of a plurality of documents from a first location to a second location distant from said first location, said system comprising:

record generating means for generating a record for each document at said first location, said record including computer readable control data and a digital bit map representative of the image of each document; said record generating means including:

optical character recognition means for reading a portion of each document and producing computer readable control data representative thereof;

scanning means for scanning said documents to provide a serial bit map representative of the images of each document; and

combining means for combining said control data and said serial bit map into said record;

first recording means coupled to said record generating means for recording said records on a first storage medium;

first reading means also at said first location for reading said records from said first storage medium;

transmission means coupled to said first reading means for transmitting said records from said first location to said second location;

receiving means at said second location for receiving said records

second recording means coupled to said receiving means for recording said records on a second storage medium;

second reading means at said second location for reading said records from said second storage medium; and

means for reproducing said images contained on said documents coupled to said second reading means responsive to said retrieval serial bit map of digital data.

4,958,236

IMAGE PROCESSING METHOD AND APPARATUS THEREFOR

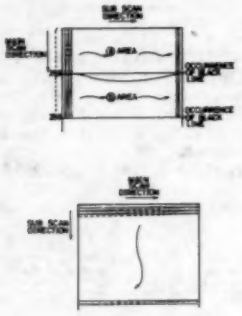
Nao Nagashima, Yokohama; Hiroyuki Ichikawa, Tokyo, and Akihiro Katayama, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 8, 1988, Ser. No. 203,880

Claims priority, application Japan, Jun. 11, 1987, 62-146311; Jun. 11, 1987, 62-146312; Jun. 11, 1987, 62-146313; Jun. 11, 1987, 62-146314; Jun. 11, 1987, 62-146315; Jun. 11, 1987, 62-146316; Jun. 11, 1987, 62-146317

Int. Cl.[5] H04N *1/40*

U.S. Cl. 358—445 **70 Claims**



1. An image processing apparatus comprising:

reading means for reading an image by dividing the image into plural areas, and for providing image data; and

process means for performing a quantization process on the image data obtained from said reading means to obtain record data to be used in a recording,

wherein said process means performs, in the recording, a quantization process of the image data to give continuity to the plural areas read by said reading means.

4,958,237

METHOD OF MAKING ENLARGED PRINTS BY SUBDIVIDING AN ORIGINAL IMAGE AND INTERPOLATING THE SUBDIVIDED IMAGE

Kazufumi Kubota, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 9, 1988, Ser. No. 269,086

Claims priority, application Japan, Nov. 9, 1987, 62-282515

Int. Cl.[5] H04M *1/393*

U.S. Cl. 358—451 **15 Claims**

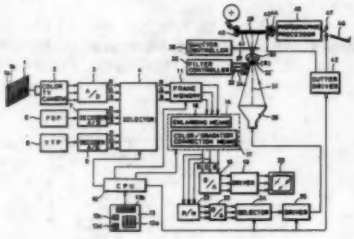
1. A method of making a large size of print, comprising the steps of:

storing video signals of an image of an original in memory areas of a memory, wherein said memory areas correspond to a matrix of smaller divisions of said original;

dividing said image of said original into said smaller divisions by reading said video signals from said memory areas of said memory, respectively;

processing said video signals read out from each of said memory areas for enlargement;

making a hard copy of an enlarged image of each of said smaller divisions of said original in response to said processed video signals; and



arranging said hard copies of said enlarged images of all said smaller divisions of said original to thereby form a large print of said original.

4,958,238

IMAGE PROCESSING METHOD AND APPARATUS WITH CONDITIONAL CORRECTION OF ERROR DATA

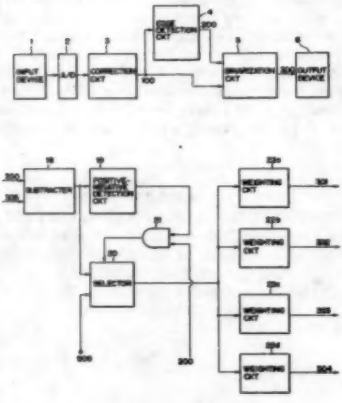
Akihiro Katayama, Kawasaki, and Hidefumi Ohsawa, Kawaguchi, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 6, 1989, Ser. No. 319,057

Claims priority, application Japan, Mar. 8, 1988, 63-054621

Int. Cl.[5] H04N *1/40*

U.S. Cl. 358—456 **23 Claims**



1. An image processing apparatus comprising:

input means for inputting image data indicative of a concentration of an image;

binarizing means for binarizing the image data input by said input means;

correction means for correcting error data generated when the image data is binarized by said binarizing means;

control means for controlling whether or not correction of the error data is to be performed by said correction means; and

state detecting means for detecting a state of the error data,

wherein said control means controls said correction means, in accordance with a detection result obtained by said state detecting means, such that said correction means performs correction of the error data in a portion other

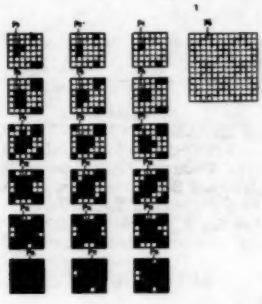
than an edge portion of the image and does not perform correction of the error data in the edge portion of the image.

4,958,239

METHOD OF GRADATION AND SELECTION OF MICRO PICTURE ELEMENTS THEREFOR IN A PICTURE DISPLAY

Kunio Yamada; Shigeru Tsukada, and Masao Seki, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Feb. 22, 1989, Ser. No. 313,416
Claims priority, application Japan, Feb. 25, 1988, 63-43101
Int. Cl.[5] G03F *3/08*
U.S. Cl. 358—457 **2 Claims**



2. A picture display method wherein a picture signal is reproduced as a picture image comprising a plurality of contiguous dots wherein each dot is represented by a corresponding picture element having a small area and each of the picture elements is further divided into micro picture elements each having a micro area and wherein a dot is printed as a selected one of a plurality of different gradations wherein each gradation is represented by coloring selected ones of the micro picture elements of the picture element corresponding to the dot, the method comprising the steps of:

converting the picture signal into a corresponding set of digital picture signals, each of said digital picture signals having a value indicating an image intensity;

storing for every possible gradation of a picture element a pattern of micro picture elements to be colored wherein the number of colored micro picture elements of contiguous elements that are in point-contact with each other is not larger than two;

selecting for each of said digital picture signals a gradation corresponding to the image intensity value thereof; and

forming on a recording medium a dot for each of said selected gradations to form a representation of the picture signal.

4,958,240

ORIGINAL READING APPARATUS APPLYING A LAMP VOLTAGE TO CORRECT LAMP BLACKENING

Shunichi Abe, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

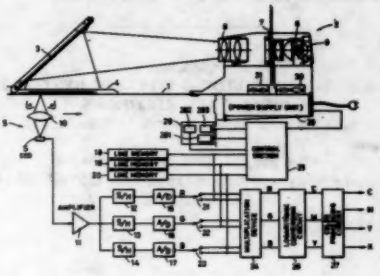
Filed May 25, 1988, Ser. No. 198,515
Claims priority, application Japan, May 25, 1987, 62-127798
Int. Cl.[5] H04M *1/04*
U.S. Cl. 358—475 **9 Claims**

1. An original reading apparatus comprising:

a lamp for illuminating an original;

reading means for reading an image formed on the original illuminated by said lamp; and

control means adapted to apply to said lamp a first predetermined voltage after reading of the image formed on the original has been completed, if a voltage applied to said lamp at the time of the original image reading is lower



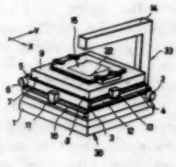
than a second predetermined voltage, said first predetermined voltage being higher than said voltage applied to said lamp at the time of the original image reading.

4,958,241

IMAGE INPUT APPARATUS

Fumio Ohtomo; Hiroyuki Frusho; Shinichi Nakamura, and Toshifumi Mihashi, all of Tokyo, Japan, assignors to Kabushiki Kaisha Topcon, Tokyo, Japan

Filed Jun. 9, 1989, Ser. No. 363,762
Claims priority, application Japan, Jun. 16, 1988, 63-146802; Jun. 16, 1988, 63-146803
Int. Cl.[5] H04M *1/04*
U.S. Cl. 358—487 **21 Claims**



1. An image input apparatus for converting an image on an image source into digital information, comprising:

an image sensor located at a position relative to the image source, the image sensor having a photosensitive surface of a predetermined size;

first means for projecting two-dimensional image segments into which the image is divided, in a predetermined sequence onto the photosensitive surface of the image sensor, each of the image segments having a size corresponding to the predetermined size of the photosensitive surface;

the image sensor converting an image segment projected on the photosensitive surface into an electric signal;

second means for converting the electric signal into digital information of an array of pixels regarding the projected image segment;

the second means including means for minifying the converted digital information at a predetermined minification ratio to form minimized information of a sampled image of the image segment in such a manner that a value of one of each of N×N arrays of pixels may be sampled to form the sampled image and then the sampled image may be formed by averaging the value of each of N×N arrays of pixels; and

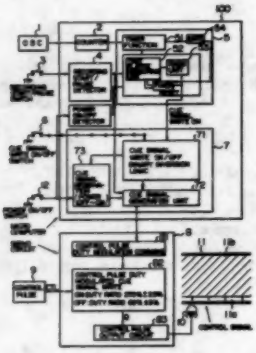
third means including means for holding the relative position between the image source and the image sensor for an interval of time required for the second mans to convert the electric signal into the digital information.

4,958,242

CUE SIGNAL RECORDING CONTROL SYSTEM FOR VIDEO TAPE RECORDER

Morio Aoki, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 12, 1989, Ser. No. 364,460
Claims priority, application Japan, Jun. 15, 1988, 63-145706
Int. Cl.[5] G11B *5/02, 27/02*
U.S. Cl. 360—27 **7 Claims**



1. A cue signal recording system for a video tape recording apparatus comprising means for generating a cue signal; means for recording the cue signal generating means on a control track of a video tape when recording is enabled; and control means for activating said cue signal generating means only upon occurrence of a predetermined event, said control means including a timer function unit, a detector unit for detecting the recording mode and a mode other than said recording mode, a date change unit responsive to the detector unit for delivering a cue signal write ON command signal when a change of data occurs, and a cue signal generation unit responsive to the output of said data change unit to deliver a cue signal.

4,958,243

PHASE DISCRIMINATION AND DATA SEPARATION METHOD AND APPARATUS

Shin C. Chen, San Jose, and Lionel D. Provazek, Campbell, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

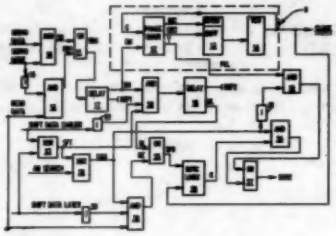
Filed Sep. 15, 1988, Ser. No. 245,100
Int. Cl.[5] G11B *5/09*
U.S. Cl. 360—51 **11 Claims**

1. A method of maintaining read data pulses standardized to a data-synchronized clock, comprising the steps of:

delaying the read data pulses a preselected time interval to provide data normal pulses,

applying the data normal pulses to a phase-locked loop (PLL) to provide and define the clock,

responsive to a control signal indicative of a potentially uncorrectable error, selectively, according to a preselected choice, generating data early pulses corresponding to the read data or generating data late pulses corresponding to further delayed read data pulses, and selectively clocking out according to said choice bits corresponding to the data early or data late pulses to error



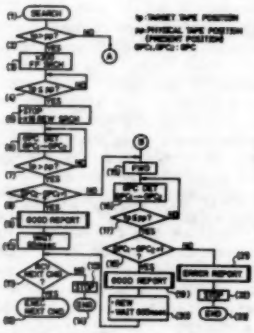
correction circuitry in an attempt to render the error correctable.

4,958,244

METHOD OF POSITION DETECTION ON A RECORDING MEDIUM

Yoshizumi Inazawa, Kanagawa, Japan; Brian Milthorp, Bristol, United Kingdom, and Bruce Thompson, Ft. Collins, Colo., assignors to Sony Corporation, Tokyo, Japan

Filed Jan. 5, 1989, Ser. No. 294,053
Claims priority, application United Kingdom, Jan. 8, 1988, 8800352
Int. Cl.[5] G11B *27/19*
U.S. Cl. 360—72.1 **10 Claims**



1. A search method for locating a target position on a recording medium on which a plurality of position signals are recorded at intervals, comprising the steps of:

(a) driving the recording medium in first one direction while detecting the recorded position signals from a position which is fixed relative to the recording medium,

(b) reversing the direction of recording medium travel when a predetermined recorded position signal corresponding to the target position is detected,

(c) decreasing the travel speed of the recording medium until the predetermined recorded position signal is again detected,

(d) repeating steps a–c, inclusive, a predetermined number of times so as to detect the target position on the recording medium, and wherein

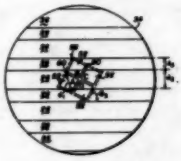
(e) after it is detected that the target position has been last passed, generated a good report signal, without stopping and pausing the recording medium, indicating that the target position has been searched.

4,958,245

APPARATUS AND METHOD FOR OPTICAL SERVO CONTROL WITH MEDIA HAVING INFORMATION STORAGE AND SERVO CONTROL REGIONS OF DIFFERENT REFLECTIVITIES

Maxim Roth, Cupertino; Jimmy D. Godwin, San Jose, and Roger O. Williams, Fremont, all of Calif., assignors to Insite Peripherals, Inc., San Jose, Calif.

Filed Apr. 7, 1988, Ser. No. 178,542
Int. Cl.[5] G11B 5/596
U.S. Cl. 360—77.03 33 Claims



1. An apparatus for extracting servo control information from a magnetic information storage medium containing a plurality of reflective areas and a plurality of nonreflective areas which comprises:

a light source for illuminating a plurality of reflective areas having a first width, and a plurality of nonreflective areas having a second width, on a surface of a magnetic medium;

a collection lens for focusing an image of at least one of said reflective areas and at least one of said nonreflective areas; and

a photodetector comprising a first cell, a second cell, a third cell and a fourth cell, said first through fourth cells functioning to generate a first output signal, a second output signal, a third output signal and a fourth output signal, respectively, in response to illumination of said first through fourth cells by said image, and each of said first through fourth cells having approximately identical shapes, said shapes causing said first through fourth output signals to vary continuously as said image moves relative to said first through fourth cells.

4,958,246

DEVICE OF MULTI-CHANNEL ROTARY HEAD TYPE HAVING FUNCTION TO DISCRIMINATE RECORDED STATE

Suzumu Kozuki, Tokyo; Hiroyuki Takimoto, Kanagawa; Motokazu Kashida, Tokyo; Koji Takahashi, and Kenichi Nagasawa, both of Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 775,495, Sep. 12, 1985, abandoned. This application Dec. 19, 1988, Ser. No. 287,567
Claims priority, application Japan, Dec. 17, 1984, 59-265664; Dec. 17, 1984, 59-265665; Dec. 17, 1984, 59-254666
Int. Cl.[5] G11B 5/584, 5/09
U.S. Cl. 360—77.15 25 Claims

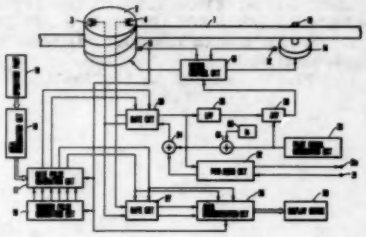
1. A rotary head type recording and/or reproducing apparatus, comprising:

(a) head means for recording and/or reproducing information signals individual in or from a plurality of parallel areas extending in the longitudinal direction of a tape-shaped record bearing medium, said head medium, said head means including a rotary head which is arranged to trace said medium in such a manner as to obliquely traverse said plurality of areas;

(b) first detection means for at least plurality detecting signals produced from said rotary head;

(c) second detection means for detecting the rotating phase of said rotary head; and

(d) discriminating means for outputting a plurality binary signals which respectively indicate a recording condition



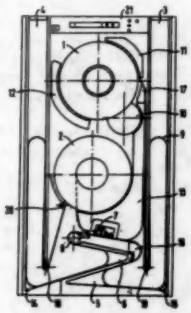
of each of at least two of said plurality of areas according to outputs of said first and second detection means one level of said binary signals indicating that said information signals are recorded, another level of said binary signals indicating that said information signals are not recorded.

4,958,247

MAGNETIC TAPE RECORDER HAVING TAPE BUFFER VACUUM CHAMBERS AND ANTE CHAMBERS

Winfried Gottwald, Krailling, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Continuation of Ser. No. 573,027, Jan. 23, 1984, abandoned. This application Sep. 23, 1986, Ser. No. 910,822
Claims priority, application Fed. Rep. of Germany, Jan. 25, 1983, 3302334
Int. Cl.[5] G11B 15/58, 5/008
U.S. Cl. 360—90 6 Claims



1. A compact magnetic tape recorder affording high speed operation and comprising an upper tape supply reel and a lower tape take-up reel both disposed for rotation and mounted on a longitudinally extended base member, the supply reel disposed longitudinally above the take-up reel, pair of first and second vacuum column buffer chambers disposed at respective opposed lateral sides of said base member and both having downwardly facing open ends, said supply and take-up reels disposed between said buffer chambers, a magnetic head assembly disposed on said base member in between said buffer chambers and longitudinally underlying said take-up reel, a single drive capstan disposed adjacent said magnetic head assembly on said base member, a pair of first and second longitudinally overlapped vacuum antechambers disposed on said base member beneath said magnetic head assembly in between

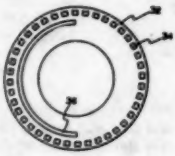
said buffer chambers and partly above said downwardly facing open ends of said buffer chambers, said first and second antechambers having respective openings.

4,958,248

REFLECTIVE TACHOMETER/HEADWHEEL ASSEMBLY FOR A ROTARY HEAD SCANNER

Milan V. Trcka, Pasadena, Calif., assignor to Datatape Incorporated, Pasadena, Calif.

Filed Dec. 19, 1988, Ser. No. 286,426
Int. Cl.[5] G11B *5/52, 21/02*
U.S. Cl. 360—107 **3 Claims**



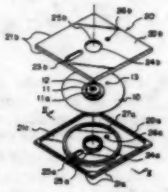
1. Rotary magnetic head scanner apparatus, comprising:
a headwheel mounted for rotation about a rotational axis; wherein said headwheel has an annular slot on one side thereof;
at least one magnetic head assembly mounted on the periphery of said headwheel;
an annular reflective tachometer mounted in said annular slot on said one side of said headwheel; and
a radiation source and a radiation sensor mounted on said one side of said headwheel, adjacent to said reflective which is reflected from said reflective tachometer to said radiation sensor, and wherein said sensor develops a signal, in response thereto, which is a function of the rotational position and/or rotational speed of said rotating magnetic heads.

4,958,249

MAGNETIC RECORDING DISK CARTRIDGE

Sadao Kadokura, Hachioji; Kazuhiro Kamei, and Yoshihisa Watamura, both of Hino, all of Japan, assignors to Teijin Limited, Osaka, Japan

Filed Jul. 18, 1988, Ser. No. 220,272
Claims priority, application Japan, Jul. 16, 1987, 62-175981; Sep. 22, 1987, 62-236303
Int. Cl.[5] G11B *23/03*
U.S. Cl. 360—133 **25 Claims**



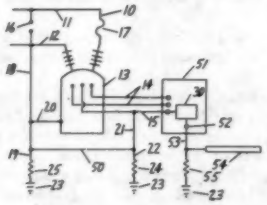
1. A magnetic recording disk cartridge comprising:
a rigid casing means having first and second inner faces confronting one another, and a planar spacing defined between said first and second inner faces;
a magnetic recording disk encased in said planar spacing of said rigid casing means to be rotatable about an axis perpendicular to said first and second inner faces of said rigid casing means; and
a stationary ring-form means for aerodynamically maintaining said magnetic recording disk at an axially middle position of said planar spacing of said rigid casing means when said magnetic recording disk is rotated in said planar spacing, said stationary ring-form means being made of a sliding material and comprising at least a pair of first and second rings arranged within the rigid casing means to confront at least an outer peripheral portion of the magnetic recording disk from both sides thereof, to thereby aerodynamically suppress fluctuation of said magnetic recording disk during the rotation thereof.

4,958,250

VOLTAGE ISOLATION APPARATUS FOR SERVICE TRANSFORMERS

Edward J. Kotski, 124 Pleasantview Rd., Hackettstown, N.J. 07840

Filed Aug. 19, 1985, Ser. No. 767,108
Int. Cl.[5] H02H *7/10*
U.S. Cl. 361—40 **6 Claims**



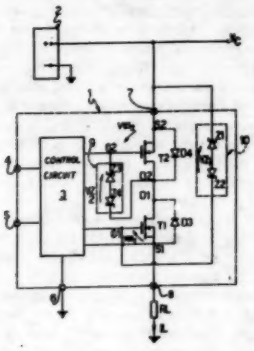
1. In an electrical power distribution system having a service transformer with primary terminals to which a primary high voltage line and neutral line are oonneoted and secondary terminals to which a high voltage line and a neutral line are connected, a primary grounding line connected between the primary neutral line and ground, and a secondary grounding line connected from the secondary neutral line to ground, the improveent comprising:
(a) a pair of high speed triggerable electronic switches connected in parallel with opposite directions of polarity, the parallel combination connected in series with an inductor, the resulting series-parallel combination connected in parallel with a varistor between first and second terminals connected, respectively, to the primary and secondary neutral lines of the transformer, the impedance of each of the switches being normally high in both directions of conduction, and each having a triggering input terminal such that when a triggering pulse is applied to the terminal, the electronic switch provides low impedance thercacross in its forward direction of current flow; and
(b) means responsive to the voltage across the first and second terminals for applying triggering signals lo the triggering inputs of the electronic switches such that a respective one of the switches is triggered to conduct in its forward direction when the voltage across the first and second terminals in the respective switch in the forward direction of conduction is greater than a preselected voltage level.

4,958,251

GUARDED ELECTRONIC CIRCUIT FROM REVERSAL OF ITS SUPPLY BATTERY POLARITY

Carlo Cini, Cornaredo, and Bruno Murari, Monza, both of Italy, assignors to SGS-Thomson Microelectronics S.r.l., Milan, Italy

Filed Jun. 23, 1989, Ser. No. 370,445
Claims priority, application Italy, Jul. 5, 1988, 21235 A/88
Int. Cl.[5] H02M 3/12
U.S. Cl. 361—84 12 Claims



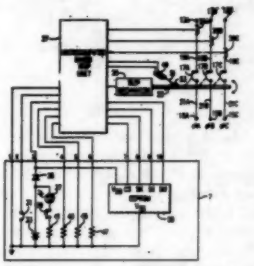
1. An electronic circuit guarded against reversal of its supply battery polarity, comprising a first power transistor connected between one pole of said battery and in series with an electric load connected to ground and functioning to drive said electric load to ground, and a second protection transistor connected in series between said pole and the first transistor and becoming non-conducting upon a reversal of the battery polarity.

4,958,252

CIRCUIT BREAKER WITH RATING PLUG HAVING MEMORY

William J. Murphy, Monroeville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 16, 1990, Ser. No. 465,663
Int. Cl.[5] H02H 3/08
U.S. Cl. 361—93 15 Claims



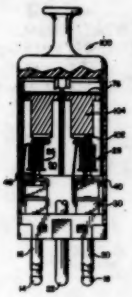
1. A circuit breaker for an electrical circuit comprising:
an operating mechanism for interrupting current in the electrical circuit when operated;
a trip device including a microprocessor which monitors the current in the electrical circuit and generates a trip by automatically operating the operating mechanism to interrupt the current in the electrical current when the current exceeds a selectable value;
a removable rating plug having means establishing the selectable value of the current at which the trip device trips the operating mechanism, and a nonvolatile memory, said microprocessor in said trip device including means generating service data and writing said service data to the non-volatile memory in the removable rating plug.

4,958,253

LINE PROTECTOR FOR A COMMUNICATIONS CIRCUIT

Alexander G. Gilberts, Algonquin, and Wayne Rust, Berwyn, both of Ill., assignors to Reliance Comm/Tec Corporation, Chicago, Ill.

Filed Oct. 25, 1989, Ser. No. 426,791
Int. Cl.[5] H02H 9/06
U.S. Cl. 361—119 9 Claims



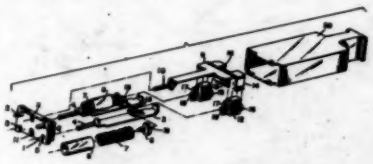
1. A line protector for a communications circuit comprising:
(a) means for connection to ground;
(b) a solid state overvoltage arrester having first and second electrodes, said first electrode connected to first and second line terminals; and
(c) a conductive pedestal having a first end, said first end receiving said second electrode, and a second end in contact with said ground connection means.

4,958,254

FIVE PIN PROTECTOR MODULE FOR TELEPHONE CIRCUITS

Dan Kidd, Cornish; John J. Napiorkowski, Cape Elizabeth, and Bruce D. Atkinson, Sebago Lake, all of Me., assignors to GTE Products Corp., Stamford, Conn.

Filed Mar. 31, 1989, Ser. No. 330,852
Int. Cl.[5] H02H 1/04
U.S. Cl. 361—119 3 Claims



1. A protector module for telephone circuits comprising a cover on an insulative base, the insulative base having first and second input pins, first and second output pins and a grounding pin all extending therefrom; a grounding member disposed within the cover and connected to the grounding pin; a bidirectional voltage sensitive switch (BVSS) disposed within the cover, the BVSS having a first and a second terminal protruding therefrom; an electrically conductive arm connected to the

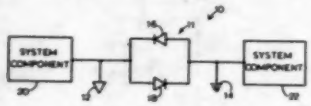
first input pin and establishing electrical connection between said first input pin and the first terminal of the BVSS; the second terminal of the BVSS being electrically connected to the grounding member; the electrical current path between the first input pin and the first output pin comprising the electrically conductive arm, a current- and/or heat-responsive assembly and an electrically conductive spring; the BVSS having a predetermined closing voltage so that a surge voltage at the first input pin exceeding said predetermined closing voltage will be conducted to the grounding pin instead of to the first output pin; the electrical current path between the first input pin and the first terminal of the BVSS including a metal pin on the current- and/or heat-responsive assembly which is in contact with said first terminal; the first terminal of the BVSS being a heat sink plate; and a sleeve being attached to the heat sink plate, the metal pin extending into the sleeve.

4,958,255

ELECTROSTATIC DISCHARGE AND ELECTROMAGNETIC INTERFERENCE PROTECTION CIRCUIT

Thomas B. Pritchard, Vancouver, Wash., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Dec. 28, 1988, Ser. No. 291,489
Int. Cl.[5] H05F *3/00*
U.S. Cl. 361—212 **14 Claims**



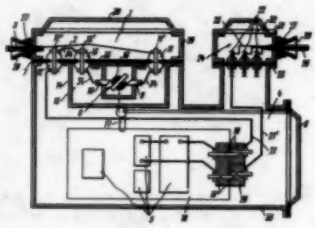
1. In an electronic system:
a first ground;
a second ground; and
a conductive protection circuit including discharge means connected between said two grounds for conducting electrostatic discharge between said two grounds while providing isolation of electromagnetic interference potentials.

4,958,256

FLAME-PROOF ELECTRIC DEVICE

Alexandr I. Parkhomenko; Vitaly S. Dzjuban, and Eduard P. Moskalev, all of Donetsk, U.S.S.R. assignor to Vsesojuzng Nauchro-Issledovatelsky Proektro-Konstruktonsky I Tekhnologichesky, Institut Vznyvozaschischenrogo I Rudnichnogo Elek Trodborudovariga, Donetsk, U.S.S.R.

Filed Sep. 26, 1989, Ser. No. 412,675
Int. Cl.[5] H02B *1/04*
U.S. Cl. 361—331 **7 Claims**



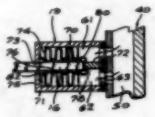
1. A flame-proof electric device, comprising:
a flame-proof lead-in chamber for a power supply cable with a current-conducting core;
an electric circuitry made up of components of said electric circuitry;
a flame-proof component chamber accommodating therein said components of said electric circuitry;
a lid on said flame-proof component chamber;
a flame-proof partition separating said flame-proof lead-in chamber and said flame-proof component chamber;
an interlocking disconnecting switch mounted on said flame-proof partition, having at least one input terminal and at least one output terminal;
at least one first lead-through current-conducting terminal mounted on said flame-proof partition for electric connection of said current-conducting core of said power supply cable with said input terminal of said interlocking disconnecting switch, said first lead-through current conducting terminal including insulating parts;
at least one second lead-through current-conducting terminal mounted on said flame-proof partition, said at least one second lead-through current-conducting terminal including insulating parts;
at least one third lead-through current-conducting terminal mounted on said flame-proof partition, said at least one third lead-through current-conducting terminal including insulating parts;
said output terminal of said interlocking disconnecting switch being connected with said components of said electric circuitry within said flame-proof component chamber via a serial connection of said third and second lead-through current-conducting terminals;
an actuating mechanism operatively connected with said interlocking disconnecting switch and said lid of said flame-proof component chamber;
a flame-proof casing secured on said flame-proof partition;
a flame-proof compartment defined by said flame-proof casing, said first and second lead-through current-conducting terminals and said flame-proof partition;
said interlocking disconnecting switch being accommodated within said flame-proof compartment.

4,958,257

HEAT CONDUCTING INTERFACE FOR ELECTRONIC MODULE

Gerhard Wenke, Los Angeles, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Mar. 29, 1989, Ser. No. 329,996
Int. Cl.[5] H05K *7/20*
U.S. Cl. 361—385 **11 Claims**



1. Heat conducting interface apparatus including an electronic module having a body supporting one or more electronic components, heat pipe means within the body in thermal communication with said components, and condensor means at least at one end of the body in thermal communication with the heat pipe means, said interface apparatus comprising:
a housing having inlet means and outlet means in fluid communication with a liquid coolant supply;
a flexible, highly heat conductive heat exchange member within said housing receiving said condensor means and having at least one highly heat conductive panel, said heat exchange member and said housing in combination forming at least one liquid coolant circulation chamber in thermal communication with said heat exchange member whereby flexible movement of said heat exchange member occurs in response to elevated fluid pressure within said liquid coolant circulation chamber, wherein said heat exchange member comprises two highly heat conductive

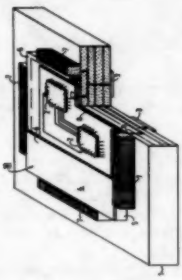
panels separating two liquid coolant circulation chambers in said housing.

4,958,258

MODULAR HYBRID MICROELECTRONIC STRUCTURES WITH HIGH DENSITY OF INTEGRATION

Stephane Charruau, Eysines, France, assignor to Thomson CSF, Paris, France

Filed Dec. 21, 1988, Ser. No. 287,285
Int. Cl.[5] H05K 1/18, 7/20
U.S. Cl. 361—386 15 Claims



1. A modular, hybrid microelectronic structure with high integration density, comprising active, encapsulated microelectronic components mounted on at least one face of a thick-layer substrate, said structure comprising:

a first multilayer substrate having on a first face at least one encapsulated microelectronic component, and a first density of individual wiring patterns; and

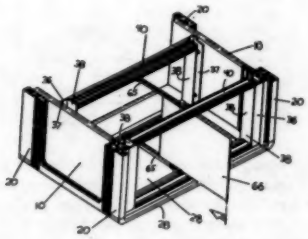
supported by a second face of said first substrate, a second multilayer substrate having at least one high integration density component, and a second density of individual wiring pattern of greater density than the first wiring pattern density of the first substrate.

4,958,259

MULTI-PURPOSE HOUSING

Franco Berg, Garbsen, and Claus-Dieter Bovermann, Breidenbach-Niederdieten, both of Fed. Rep. of Germany, assignors to Rittal-Werk Rudolf Loh GmbH & Co., KG, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 102,096, Sep. 29, 1987. This application Dec. 14, 1989, Ser. No. 451,334
Claims priority, application Fed. Rep. of Germany, Sep. 30, 1986, 3633284
Int. Cl.[5] H05K 5/00
U.S. Cl. 361—394 20 Claims



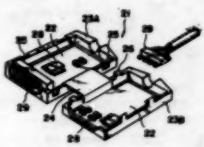
1. Multi-purpose housing for electrotechnical equipment comprising two identical side walls attached to a top wall and a bottom wall, and attachment means for installation of a component holder, cross supports, slide rails has flange supports and for attachment of a back wall, a door or an inspection window, wherein each said side wall comprises a side wall component with a corner unit mounted at each terminal vertical side wall of said side wall component; said side wall components have inner surfaces provided with vertically continuous T-grooves spaced at equal intervals from one another; said T-grooves have an inner groove base, and along at least a portion of the vertical height of said T-grooves, said inner groove base has an opening and makes a transition into a continuous screw channel which is generally round in cross section; said corner units are provided with at least one vertically continuous T-groove corresponding to and offset from said T-grooves in said side wall components; and connecting strips with tapped holes and closing strips are insertable into said side wall component T-grooves and said corner unit T-grooves.

4,958,260

MOLDED CIRCUIT BOARD

Kenzo Kobayashi, Ichihara, and Hirokazu Shiroishi, Hiratsuka, both of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Feb. 15, 1989, Ser. No. 311,462
Int. Cl.[5] H05K 1/00
U.S. Cl. 361—398 4 Claims



1. A molded circuit board comprising:

a circuit film having a desired circuit pattern formed thereon; and

a plurality of resin moldings formed on one side of said circuit film, said resin moldings being molded and spaced at specified distances from adjacent moldings so as to be integrated with and formed in one molding operation with said circuit film, said plurality of resin moldings thus forming at least one molding-free portion being capable of being assembled into a box with only said at least one molding-free portion of said circuit film being bent during assembly into a box.

4,958,261

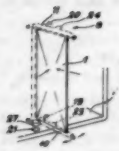
DEVICE FOR THE MECHANICAL SHIELDING OF PRINTED CIRCUIT BOARDS, IN PARTICULAR COLOR TELEVISION SET PRINTED CIRCUIT BOARDS

Dominique Huerre, Angers, France, assignor to Societe Electronique De La Region Pays De Loire, Paris, France

Filed May 8, 1989, Ser. No. 348,512
Claims priority, application France, May 10, 1988, 88 06279
Int. Cl.[5] H05K 7/02
U.S. Cl. 361—417 6 Claims

1. A device for the mechanical shielding of a printed circuit board, in particular a color television set printed circuit board, placed in a casing with a detachable, lateral partition, one of the sides of the board being close to and parallel to said detachable partition, said shielding device comprising a U-shaped strap having a central part and two arms clamping the board on the three sides that are not closed to said detachable partition, said strap having at least two L-shaped lugs respectively associated with a respective one of said two arms which each

freely enter corresponding holes made in the bottom of the casing, each end of said U-shaped strap working together with



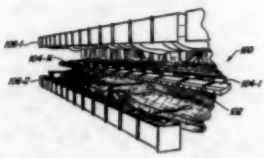
a respective guiding and holding device with limited pivoting, formed on said detachable partition.

4,958,262

APPARATUS AND METHOD FOR FACILITATING DOUBLE BLOCKING AT A DISTRIBUTING FRAME IN A TELEPHONE CENTRAL OFFICE

Harold G. Wilkie, Jr., Flat Rock, Mich., assignor to Michigan Bell Telephone Company, Detroit, Mich.

Filed Feb. 12, 1988, Ser. No. 155,230
Int. Cl.[5] H01R 9/00
U.S. Cl. 361—426 **20 Claims**



1. A method of mounting a new connector block in front of an existing connector block mounted at a distributing frame in a telephone central office, the existing connector block having a connector block housing and a terminal field mounted to the housing and normally lying in a first predetermined plane at the distributing frame, the terminal field being rotatable with respect to the housing, the method comprising:

rotating the terminal field of the existing connector block away from the first predetermined plane such that the terminal field will be accessible by lying in a second predetermined plane at a preselected angle to the first predetermined plane;

placing an adaptor bracket having first and second surfaces between the rotated terminal field and a surface of the connector block housing such that the first surface abuts the surface of the housing and the second surface extends at the preselected angle to the first predetermined plane and abuts the terminal field to maintain the terminal field at the preselected angle; and

placing and supporting said new connector block in front of said existing connector block in a manner allowing continued accessibility to the terminal field of said existing connector block as disposed in said second predetermined plane.

4,958,263

CENTRALIZED LIGHTING SYSTEM EMPLOYING A HIGH BRIGHTNESS LIGHT SOURCE

John M. Davenport, Lyndhurst; William W. Finch, Richmond Heights; Richard L. Hansler, Pepper Pike; Richard C. Nagle, Euclid, and Ronald S. White, Mentor, all of Ohio, assignors to General Electric Company, Schenectady, N.Y.

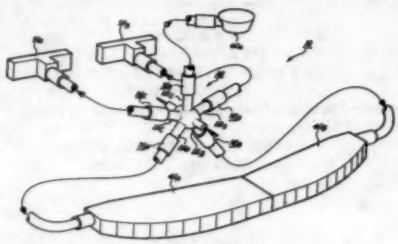
Filed Nov. 2, 1988, Ser. No. 266,129
Int. Cl.[5] F21V 7/04
U.S. Cl. 362—32 **37 Claims**

1. A light source for vehicles comprising;

(*a*) an envelope formed of a light transmissive material and containing light generating means, and

(*b*) light guide means formed of a light transmissive material and merged onto the outer surface of said envelope without substantially altering the shape of said envelope and without substantially extending into said envelope,

said light guide means having parameters that are selected



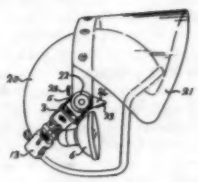
to provide forward, rearward or interior illumination for said vehicle developed by said light generating means.

4,958,264

HELMET LAMP

Jean J. Evendon, 12 Springdale, Barkham Wood, Wokingham, Berkshire RG11 4RZ, England, assignor to Jean J. Evendon, Wokingham, England

Filed Sep. 8, 1989, Ser. No. 404,406
Int. Cl.[5] F21L 15/14
U.S. Cl. 362—106 **15 Claims**



1. A lamp for use with a protective helmet having a pivotable visor, the lamp comprising a band extending around a back portion of the helmet and securing means at each end of the band releasably secured to pivots of the visor and a light source mounted on the band.

4,958,265

SYMMETRICAL COLOR CHANGER SYSTEM

Dennis Solomon, Yarmouth Port, Mass., assignor to Altman Stage Lighting Co., Inc., Yonkers, N.Y.

Continuation of Ser. No. 164,397, Mar. 4, 1988, Pat. No. 4,897,770. This application Aug. 15, 1989, Ser. No. 393,979
Int. Cl.[5] F21V 9/00
U.S. Cl. 362—293 **17 Claims**

1. A color changer system including a source of white light forming a light beam having a beam axis of propogation and a beam aperture through which the light beam passes, the beam aperture having a center coextensive with the axis of propagation, comprising, in combination,

oppositely disposed color filter means positioned adjacent to the beam aperture,

said oppositely disposed color filter means including first color filter means positioned adjacent to the beam aperture and second color filter means positioned adjacent to

the beam aperture in substantially the same plane as that of said first color filter means, said first and second color filter means being simultaneously movable across the beam aperture orthogonal to the beam aperture and being adapted to meet in a mid position relative to the center of said beam aperture,

said first and second color filter means further including a plurality of progressive variable filter regions ranging as percents of color filtering capacity relative to a particular color and ranging between 10% and 50% in 10% incremental ranges, each large enough in area to cover the beam aperture area, and the color densities of each filtering region differing from one another but being evenly distributed throughout each filtering region;

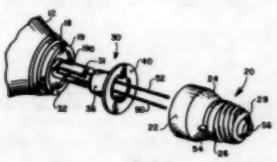
wherein selected lightwaves are deleted in predetermined amounts in accordance with the positions of said first and second color filter means across said beam aperture so as to enhance said particular color contained in said light beam; and said first and second color filter means being simultaneously movable into the light beam symmetrical to the beam axis of propagation so that distribution of color saturation of the light beam is symmetrical about the center of the beam aperture during movement of said first and second color filter means, whereby a generally even level of color saturation across the beam aperture is achieved during movement of said oppositely disposed color filter means.

4,958,266

LAMP HAVING AN IMPROVED BULB MOUNTING MEMBER

Robert C. Sorensen, Burr Ridge, and Thomas S. Hendrickson, Crestwood, both of Ill., assignors to RCS Industries, Inc., Alsip, Ill.

Filed Jan. 2, 1990, Ser. No. 459,967
Int. Cl.[5] F21V *7/02*
U.S. Cl. 362—310 **11 Claims**



1. A lamp comprising an outer envelope defining a space, said outer envelope including front and rear portions and an opening through said rear portion, a one-piece bulb mounting member including a hollow post and a radially outwardly extending flange formed at one end thereof, said flange being adjacent to said rear portion and said post protruding through said opening and into said space, a bulb secured to the other end of said post and including lead wires extending through the interior of said post, and a lamp base secured to said rear portion and electrically connected to said lead wires.

4,958,267

PORTABLE LAMP

Karl A. Baake, Angola, N.Y., assignor to K & H Industries, Inc., Angola, N.Y.

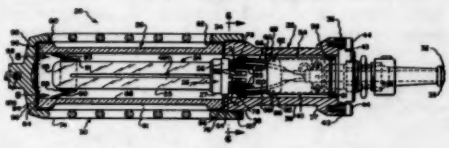
Division of Ser. No. 177,127, Apr. 4, 1988, Pat. No. 4,885,670. This application Nov. 20, 1989, Ser. No. 439,438
Int. Cl.[5] F21L *15/12*
U.S. Cl. 362—399 **4 Claims**

1. A portable electric lamp comprising:

an elongated hand grip having two opposite ends;

an electric light-generating portion attached to so as to extend from one end of the hand grip;

conducting means for supplying electric power to the light-generating portion including a power cord routed through the other end of the hand grip for operative connection with the light-generating portion; and



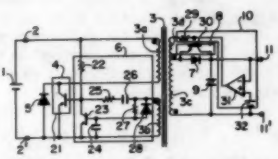
an amount of magnesite base cement positioned in said hand grip and interposed between the light-generating portion and a section of the power cord entering said other end of the hand grip.

4,958,268

SWITCHING POWER SUPPLY

Nobuyoshi Nagagata, Kadoma, and Osamu Hiromura, Yawata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 5, 1989, Ser. No. 333,310
Claims priority, application Japan, Apr. 5, 1988, 63-83327; Apr. 28, 1988, 63-106392; Jun. 9, 1988, 63-142117; Dec. 12, 1988, 63-313387
Int. Cl.[5] H02M *3/335*
U.S. Cl. 363—16 **10 Claims**



1. A switching power supply comprising:

first switching means connected to receive an applied input voltage and for providing an output at which said input voltage is switched on and off;

a transformer having a primary winding connected to the output of said first switching means;

first rectifying and smoothing means connected to a secondary winding of said transformer; and

second switching means operative alternately with respect to said first switching means for releasing the output of said first rectifying and smoothing means back to said secondary winding of said transformer during the off-period of said first switching means, whereby the output of said first rectifying and smoothing means which is applied to said secondary winding is released back to said primary winding of said transformer, and wherein said second switching means is controlled by the output of said first rectifying and smoothing means.

4,958,269

CURRENT CONTROL FOR MICROPROCESSOR MOTOR DRIVE

David Gritter, Racine, Wis., assignor to Eaton Corporation, Cleveland, Ohio

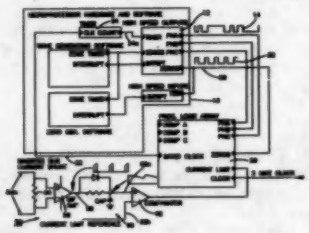
Filed Jul. 27, 1988, Ser. No. 225,091
Int. Cl.[5] H02D *5/40*; H02P *1/26*
U.S. Cl. 364—153 **14 Claims**

1. A motor control for controlling energization of a multiple phase alternating current motor having multiple motor windings comprising:

(a) a programmable controller for providing a shaped, time varying digital energization signal for each phase wherein

the state of the time varying digital energization signal corresponds to an energization state of a motor winding corresponding to that phase;

(b) a current control circuit for monitoring motor current supplied to said motor, comparing said motor current with a threshold, and generating a modulation output to reduce the frequency and voltage of energization signals coupled to said motor when the motor current exceeds the threshold; and



(c) logic circuitry coupled to the programmable controller and the current control circuit for receiving both the time varying digital energization signals from the programmable controller and the modulation output of said current control circuit and for producing a resultant motor control output for controlling energization of the motor windings, said resultant motor control output reducing motor energization voltage across the motor windings to zero and preventing change in motor energization signals for a duration corresponding to the degree to which the motor current exceeds the threshold.

4,958,270

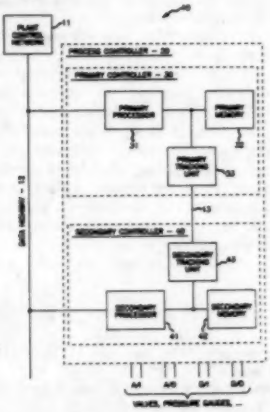
METHOD FOR CONTROL DATA BASE UPDATING OF A REDUNDANT PROCESSOR IN A PROCESS CONTROL SYSTEM

Paul F. McLaughlin, Hatfield, and Pankaj H. Mody, Horsham, both of Pa., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 23, 1989, Ser. No. 299,859

Int. Cl.[5] G06F *11/20*

U.S. Cl. 364—187 **8 Claims**



1. In a process control system having a process controller, said process controller including a first and second controller, one of said controllers being designated as a primary controller and the other being designated as a secondary controller, each controller having a corresponding image of a data base, and wherein the primary controller is performing predefined control functions of the process control system, a method for updating the data base associated with the secondary controller comprising the steps of:

(a) performing a predefined control function;

(b) updating the data base associated with the primary controller as a result of performing the predefined control function;

(c) capturing predetermined information being stored in the primary data base simultaneously with the step of updating;

(d) repeating steps (a) through (c) until all the predefined control functions have been performed; and

(e) transferring the predetermined information captured in step (c) to the secondary controller.

4,958,271

TRANSFER CONTROL EQUIPMENT

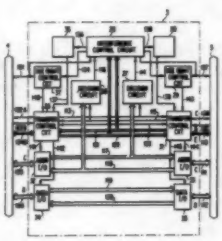
Shouki Yoshida, and Setsuo Shimada, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 806,861, Dec. 9, 1985, abandoned. This application Oct. 11, 1988, Ser. No. 255,898

Claims priority, application Japan, Dec. 7, 1984, 59-257637; Mar. 1, 1985, 60-41396; Mar. 1, 1985, 60-41397

Int. Cl.[5] G06F *13/42*

U.S. Cl. 364—200 **9 Claims**



1. A transfer control unit connected to a plurality of common buses which together form an asynchronous communication system that permits the buses to be selectively operable in synchronism with each other, each of at least a first and second of said common buses having respective bus cycles and being connected to a respective central processing unit (CPU) and one or more respective peripheral units, each of said respective peripheral units having a unit address and being operative to generate transfer requests, said transfer control unit being able to read data, including input/output instructions, from at least one of said central processing units or write said data into at least one of said central processing units and one of said peripheral units, said transfer control unit comprising:

decision means, comprising a detection circuit for detecting signals on a bus, connected to at least said first and second common buses and operative for identifying a transfer request, comprising an input/output instruction, on at least one of said first and second common buses and for generating a first transfer request signal; and

transmission means coupled between at least said first and second common buses for transmitting during one bus cycle of said first common bus a unit address, data and a control signal, for executing the input/output instruction detected by said detection circuit, to said second common bus, said transmission means comprising a first send line and a first reply line connected to said first common bus and a second send line and a second reply line connected to said second common bus, and being operative to carry send and reply signals which identify at least an existence

of transfer requests on said first bus and establish said synchronism between said first and second buses;

time supervisor means responsive to a first transfer request signal and connected at least to said first common bus and said second common bus for supervising the time required to transfer data by said first common bus, during a first predetermined time beginning with an input of said first transfer request signal, and for generating and sending a second transfer request signal to said second common bus for facilitating the establishment of a link between said first and second bus systems via said transmission means, if there has been a passage of said first predetermined time without a generation of any response signal on said first common bus to said first transfer request; and

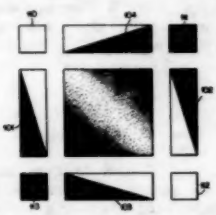
minimum time assuring means operative in connection with said transmission means for assuring that there is sufficient time for a sending of data and address signals to said second common bus, said sufficient time being greater than a second predetermined time beginning with a change of address and data sending control signals on said second common bus, in order to compensate for a case when there is a response to said first transfer request on said first common bus after a second transfer is input on said first bus.

4,958,272

APPARATUS AND SYSTEM FOR GENERATING SMOOTH SHADED CONTINUOUS TONE IMAGES

Warren K. Wake, Nashua, N.H., assignor to Xyvision Design Systems, Inc., Wakefield, Mass.

Filed Feb. 17, 1988, Ser. No. 157,457
Int. Cl.[5] G06F *15/62*
U.S. Cl. 364—518 **16 Claims**



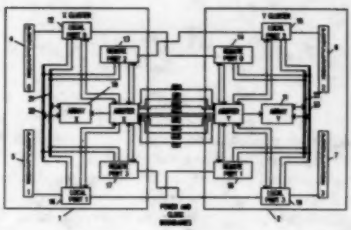
1. In combination in a system for generating a smooth shaded continuous tone image comprising; input means for entering user selected perimeter constraint information comprising curve shape and color data, data processing means for determining a surface map of Intensity, I (X, Y), based on said perimeter constraint information, and further generating the continuous tone image as a two-dimensional matrix of image pixels each pixel characterized by an intensity level derived from said surface map, with position defined by matrix coordinates in the continuous tone image, iterative review means permitting modification of said perimeter constraint information in developing the smooth shaded continuous tone image and memory means for storing the continuous tone image.

4,958,273

MULTIPROCESSOR SYSTEM ARCHITECTURE WITH HIGH AVAILABILITY

Patrick E. Anderson, San Jose, Calif.; Roland J. Buston, Tucson, Ariz.; William T. Higgins, San Jose, Calif.; Ronda J. Hruby, San Jose, Calif., and Serge Mirabeau, San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 26, 1987, Ser. No. 89,372
Int. Cl.[5] G06F *15/16, 13/14, 11/00*
U.S. Cl. 364—200 **10 Claims**



1. A multiprocessor system of the kind in which each processor accesses common system information asynchronously, the information being updateable by more than one processor simultaneously and dynamically, the system comprising:

two processor clusters each comprising at least two processors, each cluster operating on a separate clock and power boundary,

an array in each cluster having definable, lockable regions therein for storing said system information,

a plurality of local ports and a plurality of remote ports in each cluster coupled to the array for enabling execution of array operations in that cluster;

each processor in each cluster being connected to a respective local port, each local port having at least one register for storing address, data, control and status information and each local port being coupled to a corresponding one of said remote ports in the other cluster for communication therewith;

each remote port having at least one register, each such register being connected to a corresponding register in the respective coupled local port of the other cluster, said at least one register storing said address, data, control and status information for causing array operations to be executed selectively in either cluster or in both of said clusters concurrently; and

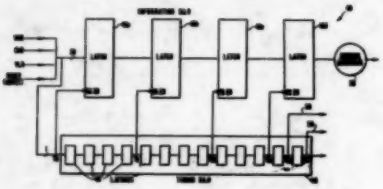
an arbiter in each cluster connected to the local ports and remote ports therein, each arbiter being coupled to its corresponding array for controlling access thereto and operation thereof, each arbiter communicating with the arbiter of the other cluster for arbitrating global operations, including dual mode TEST AND SET and UNCONDITIONAL SET operations, to its own array and the other (remote) array, and each arbiter comprising means for executing read/write operations in unused array cycles between the TEST portion and the SET portion of a TEST AND SET operation.

4,958,274

SYSTEM WITH A N STAGES TIMING SILO AND P STAGES INFORMATION SILO FOR SOLOING INFORMATION

Todd A. Dutton, Westboro, and Walter A. Beach, Bedford, both of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Jun. 1, 1988, Ser. No. 201,481
Int. Cl.[5] G06F 9/315
U.S. Cl. 364—200 21 Claims



11. A vector processor comprising:

vector registers for storing data;

a first logic unit coupled to said vector registers, said first logic unit sending logical results to said vector register an integer number q cycles after receiving input rom said vector registers;

a second logic unit coupled to said vector registers, said second logic unit sending multiplication results to said vector registers an integer number x cycles after receiving input form said vector registers;

a vector controller coupled to said vector registers and to said first and second logic units, said vector controller generating information for a particular command concurrently with said vector registers sending operands to one of said first and second logic units corresponding to said particular command;

a timing silo coupled to said vector controller having an interger number n of timing state devices forming a set sequentially connected for receiving and siloing a series of bits from said vector controller wherein at least one of said bits is an enabling bit; and

an information silo coupled between said vector controller and said vector registers having an integer number p of information state devices forming a set sequentially connected for receiving and siloing information from said vector controller, said p information state devices having device enables coupled to different locations in said timing silo wherein each said different location is separated from another one of said different locations by a plurality of said timing state devices such that said enabling bit at a particular location in said timing silo enables one of said p information state devices which is coupled to said particular location to receive said information from a previous information state device, wherein p is greater than one and is equal to or less than one half the value of n.

4,958,275

INSTRUCTION DECODER FOR A VARIABLE BYTE PROCESSOR

Hiroshi Yokouchi, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

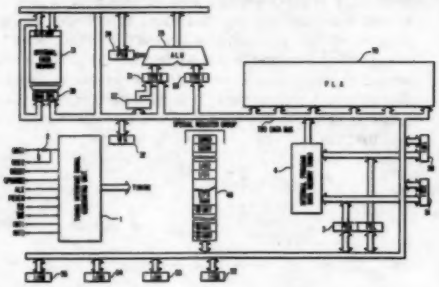
Filed Jan. 6, 1988, Ser. No. 141,234
Claims priority, application Japan, Jan. 12, 1987, 62-3305
Int. Cl.[5] G06F 9/32
U.S. Cl. 364—200 2 Claims

1. An instruction decoder for a variable byte processor, the variable byte processor of the type which is processed by an instruction containing a first byte representing an operation code and a second byte representing an operand address, said instruction decoder comprising:

an instruction register for reading an instruction of the second byte, and connected to a data bus;

a first programmable logic array means, connected to said instruction register, for reading an instruction from said instruction register to control the general operation of the variable byte processor, and for providing a consecutive execution mode signal upon the reception of a consecutive execution instruction specifying a sequential repetition of a same instruction for operands stored at different internal operand addresses;

a consecutive instruction execution cycle monitoring means, connected to the data bus, which is set for a set value indicating a number of consecutive instruction execution cycles when the consecutive execution mode signal is provided, for counting the number of execution cycles



every time an execution cycle is completed, and for providing a count completion signal upon a coincidence of the count of the execution cycles with the set value;

register/counters means, connected to the consecutive instruction execution cycle monitoring means, for increasing a count by one every time one execution cycle of the instruction is completed and for providing different addresses, respectively;

a second programmable logic array means for receiving outputs of said register/counters means and for specifying data at different operand addresses sequentially; and

a read inhibiting means, connected to said instruction register, for inhibiting said instruction register from reading a new instruction from the data bus during a time period extending from a moment when said consecutive execution mode signal is provided to a moment when the count completion signal is provided.

4,958,276

SINGLE CHIP PROCESSOR

Atsushi Kiuchi, Kunitachi; Kenji Kaneko, Sagamihara; Jun Ishida; Tetsuya Nakagawa, both of Koganei; Yoshimune Hagiwara, Hachioji; Takashi Akazawa, Musashimurayama, and Tomoru Sato, Kodaira, all of Japan, assignors to Hitachi, Ltd. and Hitachi VLSI Engineering Corporation, both of Tokyo, Japan

Filed Dec. 4, 1987, Ser. No. 128,585
Claims priority, application Japan, Dec. 12, 1986, 61-297036
Int. Cl.[5] G06F 5/06
U.S. Cl. 364—200 10 Claims

1. A single chip processor to be coupled to an external program memory which stores instructions, comprising:

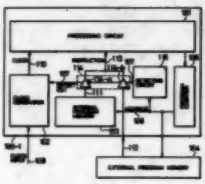
(a) a processing circuit;

(b) an internal program memory for storing instructions;

(c) a program counter for generating addresses for an access to said external program memory and said internal program memory in response to a signal from said processing circuit;

(d) detecting means for determining whether an address generated by said program counter is an address for read-

ing an instruction from said external program memory or an address for reading an instruction from said internal program memory; and



(e) means for varying the instruction cycle time of said single chip processor in accordance with the result of the determination by said detecting means.

4,958,277

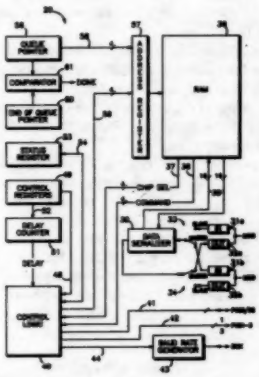
QUEUED SERIAL PERIPHERAL INTERFACE FOR USE IN A DATA PROCESSING SYSTEM

Susan C. Hill; Joseph Jelemensky; Mark R. Heene, all of Austin; Stanley E. Groves, Round Rock, all of Tex., and Daniel N. DeBrito, Carmel, Ind., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 77,469, Jul. 24, 1987, abandoned. This application Apr. 21, 1989, Ser. No. 342,651

Int. Cl.[5] G06F *3/00, 13/00, 13/12*

U.S. Cl. 364—200 **18 Claims**



1. A microcomputer comprising a central processing unit and a serial data communication apparatus, the serial data communication apparatus further comprising:

a first memory coupled to the central processing unit, said first memory having a first predetermined number of storage locations;

transfer means coupled to said first memory for executing serial data transfers between the serial data communication apparatus and at least one other device coupled thereto, the transfer means further comprising:

means for retrieving data from said first memory at a first one of said first predetermined number of storage locations;

means for transmitting said retrieved data to said at least one other device;

means for receiving data from said at least one other device; and

means for storing said received data in said first memory at a second one of said first predetermined number of storage locations;

a second memory coupled to the central processing unit, said second memory having a second predetermined number of storage locations;

queue pointer means coupled to said first memory means for maintaining a queue pointer value which specifies said first one of said first predetermined number of storage locations; and

control means coupled to said central processing unit, said transfer means, said first and second memories and said queue pointer means for responding to a first state of an enable bit stored in said second memory at a first one of said second predetermined number of storage locations by directing said transfer means to execute one of said serial data transfers and by incrementing said queue pointer value and for responding to a second state of said enable bit by disabling said transfer means;

the serial data communication apparatus is characterized in that:

said control means is further responsive to the central processing unit, while said enable bit is in said first state, to modify said queue pointer value by replacing said queue pointer value with a new queue pointer value provided by the central processing unit instead of incrementing said queue pointer value.

4,958,278

METHOD FOR LOADING DATA OR PROGRAM TO A PLURALITY OF TERMINAL STATIONS

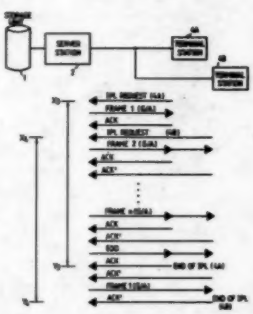
Shinichi Meguro, Kanagawa, Japan, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 8, 1988, Ser. No. 179,361

Claims priority, application Japan, May 11, 1987, 62-112683

Int. Cl.[5] G06F *15/16*

U.S. Cl. 364—200 **2 Claims**



1. An apparatus for loading data or a program from a server station to each of a plurality of terminal stations in response to individual requests from said terminal stations comprising:

means for generating and transmitting from one terminal station to the server station a request message for loading of data or a program;

means for initiating transmission from said server station to said one terminal station and other terminal stations the data or the program;

means for receiving, at another terminal station, the data or the program which is being transmitted from said server station; only if said another terminal station issues a request to said server station for loading of the data or the program during loading of the data or the program for said one terminal station; and

means for retransmitting from said server station portions of the data or the program not received by said another terminal station after completion of loading of the data or the program for said one terminal station.

whereby portions of the data or program sent by said server station before said another terminal station issued the request for loading are sent by said means for retransmitting from said server station to said another terminal station following the initial transmission such that said one terminal station and said another terminal station can receive data simultaneously when said another terminal station issues a request during transmission to said one terminal station.

4,958,279

ASSEMBLY COMPRISING A CASE FIXED ON A SUPPORT

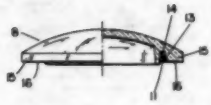
Francois Proellochs, Forel, Switzerland, assignor to Epoque Watch S.A., Switzerland

Filed Feb. 11, 1988, Ser. No. 154,948

Claims priority, application Switzerland, Feb. 13, 1987, 551/87

Int. Cl.[5] G04B *37/00*; A45C *11/10*

U.S. Cl. 368—282 **22 Claims**



1. An assembly comprising a case (8, 9) fixed on a support (1), characterized in that the case and the support comprise cooperation holding means (3, 19) for assuring a detachable fixing of the case on the support, the support being provided in the form of a rigid bracelet (1), having a flat part (21) comprising an opening (3) into which the case is detachably fixable, the bracelet, including said opening, being first completely covered with a removable and interchangeable sheath (1a) made of an elastic fabric or a thin synthetic or natural elastic material, such that the sheath is interposed between the case and the opening as the case is detachably fixed therein.

4,958,280

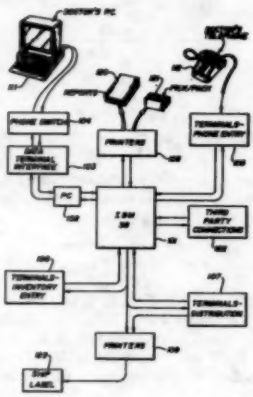
APPARATUS AND METHOD FOR SATISFYING DISPOSABLE CONTACT LENS PRESCRIPTIONS

Thomas E. Pauly; Jeffrey C. Van Doren; John P. Hennessey, and James M. Christiansen, all of Jacksonville, Fla., assignors to Vistakon, Inc., Jacksonville, Fla.

Filed Jul. 10, 1987, Ser. No. 72,184

Int. Cl.[5] G06F *15/20*

U.S. Cl. 364—403 **10 Claims**



1. An integrated system for initial and ongoing supply of prescription disposable contact lenses comprising:

central computer means including plural file storage means said plural means being respectively dedicated to predetermined data files;

means, associated and communicating with said central computer means, for automated processing of prescription orders and prescription changes;

distributed computing means useful by respective prescribing parties for communicating with said means for automated processing; and

manually operable terminal means, associated and communicating with said central computer means, for manual processing of prescription orders and prescription changes;

said central computer means further including means operable on predetermined periodicity, for initiating prescription refills for standing orders, and means for automatically integrating prescription changes with said prescription orders, and prescription refills.

4,958,281

SIGNAL PROCESSING METHOD FOR DETERMINING BASE SEQUENCE OF NUCLEIC ACID

Makoto Hara, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 10, 1986, Ser. No. 917,609

Claims priority, application Japan, Oct. 11, 1985, 60-226091

The portion of the term of this patent subsequent to Jan. 31, 2006, has been disclaimed.

Int. Cl.[5] G01N *33/58*

U.S. Cl. 364—413.01 **10 Claims**

1. A signal processing method for determining base sequence of nucleic acids by subjecting digital signals to signal processing, said digital signals corresponding to an autoradiograph of plural distorted resolved rows which are formed by resolving a mixture of base-specific DNA fragments or base-specific RNA fragments labeled with a radioactive element in a one-dimensional resolving direction on a support medium,

which comprises the steps of:

(1) preparing at least two one-dimensional waveforms composed of signal position along the resolving direction and signal level for each band;
(2) detecting a position where the signal level is maximum on one of the one-dimensional waveforms;
(3) comparing the detected maximum signal level position on the one one-dimensional waveform with signal levels at corresponding positions on adjacent one-dimensional

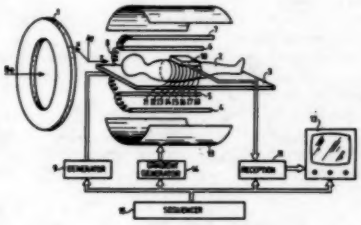
waveforms to determine a maximum position on the one-dimensional waveform having the highest signal level to be a band position;
(4) detecting a subsequent position where the signal level is maximum on said one-dimensional waveform having the band position; and
(5) repeating in order the steps (3) and (4) to thereby determine all band positions on the resolved rows.

4,958,282

3-D IMAGE RECONSTRUCTION USING FOURIER TRANSFORMATION WITH DIFFERING RESOLUTIONS OF IMAGE AXES

Yves Barjhoux, Gif sur Yvette, France, assignor to General Electric CGR S.A., Paris, France

Filed Jul. 6, 1988, Ser. No. 215,812
Claims priority, application France, Jul. 10, 1987, 87 09814
Int. Cl.[5] G01N *24/08*; G01R *33/20*
U.S. Cl. 364—413.13 **7 Claims**



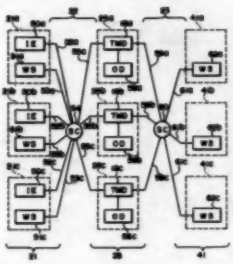
1. A method for the reconstruction of images acquired by NMR experiments on a body to be examined said method comprising for the acquisition of said images:
the execution of N macro-sequences,
each of said N macro-sequences comprising M sequences,
said sequences being designed for the excitation and measurement of NMR signals from the body,
at each sequence, P samples of this NMR signal are measured,
said method also comprising, in a vectorial computer, for the reconstruction of the images by a 3DFT type imaging method, for which the resolution M along one of the imaging axes of said images is smaller than the resolutions N and P along two other imaging axes of said images, the following steps in the following order:
a first computation, over samples of said NMR signal, of N.M.P. Fourier transforms with P computation steps, followed by:
a second computation over results given by said first computation, of N.M.P. Fourier transforms with M computation steps, followed by
a third computation, over results given by said second computation, of N.M.P. Fourier transforms with N computation steps,
the final reconstruction of the images being achieved by the end of said third computation.

4,958,283

METHOD AND SYSTEM FOR STORING AND COMMUNICATING MEDICAL IMAGE DATA

Kiyoshi Tawara; Takehiro Ema, and Eitaro Nishihara, all of Ootawara, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 8, 1988, Ser. No. 216,338
Claims priority, application Japan, Jul. 8, 1987, 62-170308; Jul. 8, 1987, 62-170310; Jul. 8, 1987, 62-170311
Int. Cl.[5] G06F *15/42*
U.S. Cl. 364—413.13 **6 Claims**



6. A system for archiving and communicating medical image data, the system comprising:
a plurality of modality means for producing medical image data;
a plurality of storing means for acquiring the medical image data from the modality means and storing the medical image data;
first network means for connecting the plurality of modality means respectively to the plurality of storing means, the first network means including a plurality of star coupler means for connecting the modality means to the plurality of storing means;
a plurality of work station means for selectively accessing the storing means to visually display the medical image data; and
second network means for connecting the plurality of work station means respectively to the plurality of storing means.

4,958,284

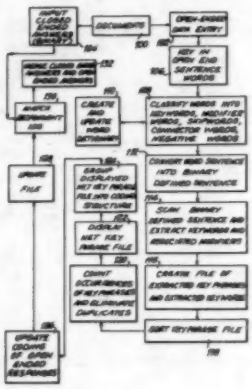
OPEN ENDED QUESTION ANALYSIS SYSTEM AND METHOD

Lawrence C. Bishop, Hauppauge, and George Ziegler, East Meadow, both of N.Y., assignors to NPD Group, Inc., Port Washington, N.Y.

Filed Dec. 6, 1988, Ser. No. 280,670
Int. Cl.[5] G06F *15/21*
U.S. Cl. 364—419 **51 Claims**

41. A data processor system for processing open-ended respondent answers to open-ended questions for providing reproducible categorized dynamically variable coding of said open-ended respondent answers to said open-end questions, said data processor system comprising display means for providing a display, means for retrievably storing a dictionary of words, said open-ended answers comprising words; means for inputting said words comprising an open-ended respondent

answer to said data processor; means for classifying said words comprising said input open-ended respondent answer into corresponding word types selected from a group of word types comprising keywords, modifier words, skip words, connector words and negative words, said keywords comprising words which are keys to conveying a true meaning of said input open-ended respondent answer, said modifier words comprising words attached to said keywords in said input open-ended respondent answer to form key phrases, said skip words comprising words unimportant to said conveying of said true meaning of said input open-ended respondent answer, said connector words comprising words which are conjunctions which connect said key phrases within said input open-ended respondent answer, said negative words comprising words which turn said key phrases into negative statements in said input open-ended respondent answers; means for updating said word dictionary means for converting said words comprising said input open-ended respondent answer into corresponding binary coded words, said word dictionary comprising dictionary words stored as corresponding binary coded words, said converting means comprising means for converting said input words into said corresponding binary coded words corresponding to said binary coded words stored as said updated dictionary words for providing a binary defined sentence corresponding to said input open-ended respondent answer; means for scanning said corresponding binary defined sentence and extracting said keywords and said modifier words associated with said keywords in said corresponding binary defined sentence; means for creating a retrievable file comprising key phrases formed from said extracted keywords and said extracted associated modifier words, and said keywords per se; means for sorting said key phrases in said created file; means for counting occurrences of said sorted key phrases and eliminating duplicates in said sorted key phrases for providing a net key phrase file, said net key phrase file being displayable on said associated display means; means for grouping said displayed net key phrases into a coding structure; and means for storing said coding structure in said data processor system.



4,958,285

NATURAL LANGUAGE PROCESSING SYSTEM

Masasuke Tominaga, Kawasaki, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 3, 1988, Ser. No. 201,998

Claims priority, application Japan, Jun. 5, 1987, 62-141108

Int. Cl.[5] G06F *15/38*

U.S. Cl. 364—419 **11 Claims**

9. A natural language processing method comprising the steps of:

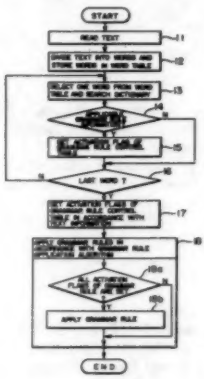
reading information of an original text;

dividing the input original text into words and storing the words in a search word table;

selecting one of the words in the search word table, searching a dictionary memory by using the selected word as a search key, and storing searched dictionary information in a word information table;

determining whether information on applicability of grammar rules is included in the dictionary information stored in the word information table;

when the information on the applicability of the grammar rules is included, starting a processing program for controlling activating flags to each of the grammar rules



stored in a grammar rule control table in accordance with applicable grammar rule information;

when the information on the applicability of the grammar rules is not included, skipping the start step of the processing program;

executing the above steps for each of other words in the search word table;

activating the grammar rules in the grammar rule control table in accordance with the information of the original text; and

processing the original text in accordance with a predetermined application algorithm of the grammar rules by taking a result of the activating process of the grammar rules into account.

4,958,286

TIME-VARIANT FILTER COEFFICIENTS

Wallace H. Meyer, Jr., Bellaire, Tex., assignor to Western Atlas International, Inc., Houston, Tex.

Filed Jun. 27, 1988, Ser. No. 212,345

Int. Cl.[5] G01V *3/18*

U.S. Cl. 364—422 **20 Claims**

18. A method for making an induction log, comprising:

(a) providing an induction logging tool having at least one transmitter coil and at least one receiver coil;

(b) suspending the logging tool in a borehole;

(c) generating an electrical signal in the transmitter coil, whereby an electrical signal is induced in the receiver coil;

(d) identifying a plurality of sample points at predetermined intervals along the axis of the borehole;

(e) moving the logging tool axially through the borehole to a sample point;

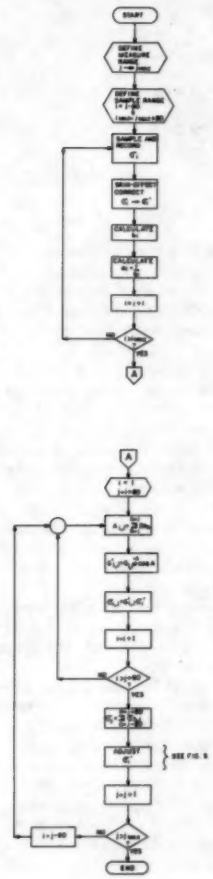
(e)(1) measuring and recording the electrical signal in the receiver coil at the sample point;

(e)(2) calculating a skin-effect corrected conductivity at the sample point;

(f) selecting a measure point within the borehole and a set of sample points;

(f)(1) for each selected sample point, generating a modified vertical geometrical factor as a function of distance in skin depths between the sample point and the measure point;

(f)(2) convolving at each selected sample point the modified geometrical factor generated in said step (f)(1) with the skin-effect conductivity calculated in said step (e)(2) to obtain an approximation for each sample point of an



elementary electrical signal contributed by the sample point at the measure point;

(f)(3) summing the approximations obtained according to step (f)(2) to obtain an approximation of the electrical signal recorded in the receiver coil at the measure point;

(f)(4) calculating an approximation for true conductivity at the measure point as a function of the sum obtained in said step (f)(3); and

(g) repeating said step (f) for a plurality of measure points to obtain a log of formation conductivity as a function of borehole depth.

4,958,287

ELECTRONIC CONTROL SYSTEM FOR AUTOMATIC VEHICLE TRANSMISSION

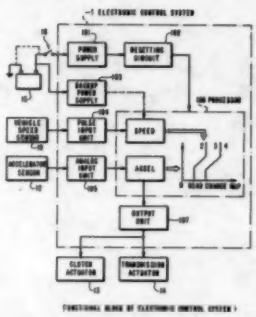
Toshiya Sugimura, Numazu, and Hiroshi Yoshimura, Hiroshima, both of Japan, assignors to Isuzu Motors Limited, Tokyo, Japan

Filed Jun. 17, 1988, Ser. No. 207,958

Claims priority, application Japan, Jun. 20, 1987, 62-152429

Int. Cl.[5] B60K *41/08, 28/10*

U.S. Cl. 364—424.1 **4 Claims**



1. An electronic control system, connected to a power supply having an output voltage, for controlling an automatic transmission mounted on a vehicle based on vehicle speed data of the vehicle indicated by a vehicle speed sensor and an accelerator position signal from an accelerator depression sensor, said electronic control system comprising:

gear position determining a gear position of the automatic transmission based on the vehicle speed data and the accelerator position signal;

resetting means for detecting the output voltage of the power supply and for generating a reset signal to reset said electronic control system when the output voltage of the power supply is cut off;

counter means for counting a first predetermined period of time after said electronic control system is reset by the reset signal;

memory means for storing the vehicle speed data occurring immediately before the output voltage of the power supply is cut off; and

control means for supplying the vehicle speed data and the accelerator position signal to said gear position determining means, and for supplying the vehicle speed data stored in said memory means and the accelerator position signal to said gear position determining means during the first predetermined period of time counted by said counter means.

4,958,288

SYSTEM AND METHOD FOR AUTOMATICALLY CONTROLLING A VEHICLE SPEED TO A DESIRED CRUISING SPEED

Hiroshi Takahashi, Komae, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Jun. 30, 1988, Ser. No. 213,927

Claims priority, application Japan, Jul. 1, 1987, 62-162221

Int. Cl.[5] B60K *31/00*

U.S. Cl. 364—426.04 **21 Claims**

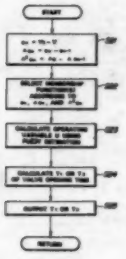
1. A system for automatically controlling the speed of a vehicle at a target cruising speed, comprising:

(a) first means for monitoring the speed of the vehicle;

(b) second means for setting the target cruising speed at which the vehicle cruises during a run of the vehicle according to a vehicle driver's decision;

(c) third means for controlling the vehicular engine output according to a controlled variable set for each predetermined interval of time, so that the monitored vehicle speed coincides with the target cruising speed set by the second means;

(d) fourth means for storing a group of input/output membership functions for deriving the controlled variable in a fuzzy estimation, each stored membership function being correctable;



(e) fifth means for setting the controlled variable in the third means, using one of the membership functions retrieved from the fourth means on the basis of the monitored vehicle speed and the target cruising speed; and

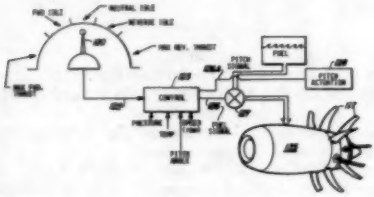
(f) sixth means for deriving a change rate of the vehicle speed on the basis of the monitored vehicle speed and correcting any one or more of the membership functions stored in the fourth means and used for setting the controlled vehicle by the fifth means under a predetermined condition on the basis of the monitored vehicle speed and said set controlled variable.

4,958,289

AIRCRAFT PROPELLER SPEED CONTROL

Michael J. Sum; George W. Bennett; Steven A. Merrell, and Neil Walker, all of Cincinnati, Ohio, assignors to General Electric Company, Cincinnati, Ohio

Filed Dec. 14, 1988, Ser. No. 284,261
Int. Cl.[5] B64C *11/44*
U.S. Cl. 364—431.01 **22 Claims**



1. A system for controlling an aircraft propeller driven by an engine, comprising:

a. means for detecting a reverse signal demanding a reversal in thrust and

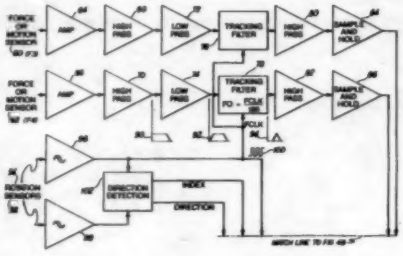
b. means for placing a limit on fuel flow to the engine in response to the reverse signal.

4,958,290

BALANCER

Paul W. Kendall, Milpitas, and Gregory H. Parrott, Cupertino, both of Calif., assignors to Accu Industries, Inc., Ashland, Va.

Filed Nov. 18, 1988, Ser. No. 273,959
Int. Cl.[5] G01M *1/22*
U.S. Cl. 364—463 **20 Claims**



1. A balancer for measuring inbalance in a vehicle wheel at any desired rotational speed, comprising:

(a) a shaft to which the wheel may be connected so that the wheel is substantially axially aligned with the shaft;

(b) a frame for supporting the shaft so that the shaft is free to rotate;

(c) two transducer means for sensing forces imposed by the shaft and for providing signals that correspond to such forces as the wheel rotates, both of which transducer means are located on the same side of the wheel;

(d) position and speed indicating means for sensing and providing signals that correspond to the augular position and speed of the wheel;

(e) two tracking filter means, each for receiving the signals from a transducer means and speed signals from the position and speed indicating means, the center frequency of which tracking filter means may be adjusted to correspond to the speed signals;

(f) parameter adjustment means of adjusting the gains of the signals from the transducer means in order to compensate for the width of the wheel and the distance of the wheel from the transducers;

(g) normalizing means for adjusting the gains of the signals from the transducer means in order to compensate for the difference of their distances from the wheel; and

(h) computing means for receiving signals from the transducer means via the tracking means and from the position and speed indicating means, for computing the imbalance of the wheel, and for indicating the size of weight which must be attached and the position at which it must be attached, in order to balance the wheel.

4,958,291

SYSTEM FOR ACCOUNTING FOR POSTAGE EXPENDED BY A POSTAGE METER HAVING SECURITY DURING EDITING OF ACCOUNTS

John R. Mamone, 30 Reut Dr., Stratford, Conn. 06497; Neale C. Hutcheson, 205 Park St., Stratford, Conn. 06840; Joseph D. Mallozzi, 112 Teeter Rock Rd.; Edward P. Daniels, 350 Stonehouse Rd., both of Trumbull, Conn. 06611, and Chikou Cheng, 313 Main Ave., Norwalk, Conn. 06851

Filed Dec. 26, 1985, Ser. No. 813,457
Int. Cl.[5] G06F *15/20*
U.S. Cl. 364—464.02 **21 Claims**

12. A postage metering and accounting system, comprising:

(a) data entry means for entry by an operator of commands and information, said information including postal infor-

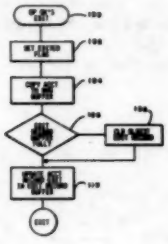
mation, said postal information including account numbers;

(b) a memory for storing program data and account records, said account records each corresponding to one of said account numbers, said memory further comprising a non-volatile memory for storing said account records;

(c)interface means for interfacing to a postage meter, said postage meter being connected to said interface

(d) processing means further comprising a CPU connected to said data entry means, said memory, and said interface, and responsive to said program data for:

(d1) responding to entry of an item of said postal information corresponding to a particular batch of mail to transmit signals through said interface to set said post-



age meter, and responding to signals received through said interface specifying postage expended to update one of said account records corresponding to one of said account numbers specified by said item; and,

(d2) responding to entry of an edit command to edit a selected one of said account records by, first setting a flag in said non-volatile memory to indicate that said selected account record is being edited, then creating a second copy of said selected a account record in a pre-selected portion of said non-volatile memory, the receiving editing information through said data entry means and updating said selected account record in accordance with said editing data, and then resetting said flag.

4,958,292

PRODUCTION CONTROL SYSTEM FOR MIXED PRODUCTION LINE

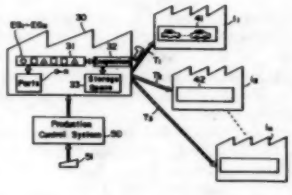
Kuniya Kaneko; Harumichi Wakiyama, both of Toyota; Tadashi Naito, Nagoya, and Toshihiro Ando, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Apr. 19, 1988, Ser. No. 183,704

Claims priority, application Japan, Apr. 22, 1987, 62-099070

Int. Cl.[5] G06F *15/24, 15/46*

U.S. Cl. 364—468 **9 Claims**



1. A production control system for use in a production factory to deliver a required number of parts corresponding to a plurality of different types of products to each of plural destinations which are spaced from said production factory and require different transport times, said system having means for providing a schedule of parts corresponding to each type of product to the production line of said production factory, said system comprising:

means for recording correcting data corresponding to the progress of said parts in said production line;

means for recording the required number of part, the different types of products, schedule times of shipping said parts, and parts correcting means for correcting said required number of parts based on said correcting data;

means for recording transport time correcting data for each product to its respective destination;

transport time correcting means for further correcting said required number of parts based on said transport time correcting data; and

final production plan scheduling means for providing the corrected required number of parts, and a corrected schedule for shipping products to said destination.

4,958,293

DIGITIZING METHOD

Kunio Tanaka; Yasushi Onishi, and Yoshihiro Itsubo, all of Tokyo, Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

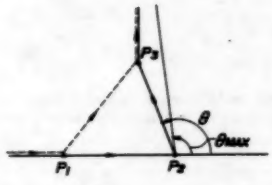
PCT No. PCT/JP88/00219, § 371 Date Oct. 27, 1988, § 102(e) Date Oct. 27, 1988, PCT Pub. No. WO88/06753, PCT Pub. Date Sep. 7, 1988

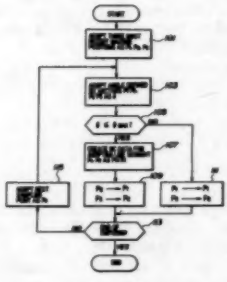
PCT Filed Feb. 29, 1988, Ser. No. 269,744

Claims priority, application Japan, Mar. 3, 1987, 62-048312

Int. Cl.[5] G05B *19/00*

U.S. Cl. 364—474.03 **9 Claims**





1. A digitizing method for moving a contractor along a model on the basis of tracer control and digitizing probe position data upon accepting the probe position data as a predetermined reference, said method comprising the steps of:

(a) computing an angle θ between a vector P_1P_2 and a vector P_2P_3 where P_1, P_2 and P_3 are first, second and third probe position data points consecutively received from the probe position data in the order of acceptance;

(b) comparing the angle θ with a present angle θ_{max};

(c) digitizing the second probe position data point P_2 unless said comparing in step (b) indicates the angle θ is larger than the angle θ_{max}; and

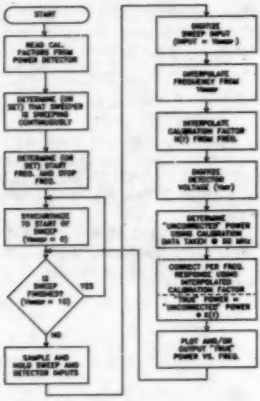
(d) machining a workpiece in accordance with the digitized probe position data.

4,958,294

SWEPT MICROWAVE POWER MEASUREMENT SYSTEM AND METHOD

Bret A. Herscher, Mt. View, and Paul R. Munro, Sunnyvale, both of Calif., assignors to Wavetek Microwave, Inc., Sunnyvale, Calif.

Filed Apr. 1, 1988, Ser. No. 176,729
Int. Cl.[5] G01R *19/00*; G06F *15/46*
U.S. Cl. 364—483 **29 Claims**


START
READ CAL. FACTORS FROM POWER DETECTOR
DETERMINE (OR SET) THAT SWEEPER IS SWEEPING CONTINUOUSLY
DETERMINE (OR SET) START FREQ. AND STOP FREQ.
SYNCHRONIZE TO START OF SWEEP (Time = 0)
IS SWEEP FINISHED? (Time = 1/f)
YES
NO
SAMPLE AND HOLD SWEEP AND DETECTOR INPUTS
DIGITIZE SWEEP INPUT (INPUT = Time)
INTERPOLATE FREQUENCY FROM Time
INTERPOLATE CALIBRATION FACTOR K(f) FROM FREQ.
DIGITIZE DETECTOR VOLTAGE (Vdet)
DETERMINE "UNCORRECTED" POWER USING CALIBRATION DATA TAKEN @ 50 MHz
CORRECT PER FREQ. RESPONSE USING INTERPOLATED CALIBRATION FACTOR "TRUE POWER = "UNCORRECTED" POWER * K(f)
PLOT AND/OR OUTPUT "TRUE" POWER VS. FREQ.

1. A method for determining a swept absolute power level (P_{abs}) of an input signal within a scalar analyzer comprising the steps of:

providing a detector calibrated at a plurality of predetermined frequencies (n) over a range of F_{min} to F_{max};

storing a predetermined calibration factor ($K(F_n)$) for said detector at each of said predetermined frequencies n;

determining a frequency (F_{in}) of said input signal;

interpolating a calibration factor $K(F_{in})$ of said input signal wherein said calibration factor $K(F_{in})$ is one of said predetermined calibration factors ($K(F_n)$);

establishing an apparent power level (P_{app}) of said input signal with respect to said calibration factor of a predetermined frequency standard; and

correcting said apparent power level P_{app} to said swept absolute power level P_{abs} by application of $K(F_{in})$.

4,958,295

ANALYZING APPARATUS AND METHOD FOR ANALYSIS OF LIQUID SAMPLES

David L. Davidson, Newark, Del.; George B. Parrent, Jr., Chelmsford; Roland W. Gubisch, Lexington, both of Mass., and Harold Hauer, Wilmington, Del., assignors to Hercules Incorporated, Wilmington, Del.

Continuation of Ser. No. 249,261, Sep. 22, 1988, abandoned, which is a continuation of Ser. No. 865,889, May 21, 1986, abandoned. This application Sep. 19, 1989, Ser. No. 409,277
Int. Cl.[5] G01N *30/04*
U.S. Cl. 364—497 **8 Claims**

1. An analyzing apparatus for detecting the properties and composition of injected liquid sample in a non-air segmented liquid stream, comprising in combination in a flow system:

a supply means for providing liquid samples, reactants and reagents to said system;

conduit means for receiving liquid samples, reactants and reagents from said supply means;

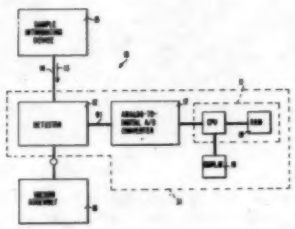
vacuum means connected to and for creating a force for driving said liquid samples, reactants and reagents from said supply means through said conduits and through a detector with a combination of valves controlling the vacuum force on said liquid samples, reactants and reagents to form a non-air segmented, integral liquid stream of non-continuous flow;

said liquid stream consisting essentially of samples, reactants or reagents in the absence of air segments in the stream whereby liquid integral segments interface with each other, said apparatus including:

means for injecting into said stream a sample so as to provide an interfacial zone of a step pulse fashioned of said liquid in the non-air segmented, integral stream of non-continuous flow;

means for observing properties of at least one concentration of a dispersed liquid at an interfacial zone of a step pulse and providing data in digital signals correlated to said observed properties;

means for the observation of known property values of an



injected standard being drawn through a detector which means generates signals representing parameter values characteristic of the flow system, summarized in digital form and processing said generated signals to evaluate properties of the dispersed liquid at the interfacial zone of samples so fashioned and drawn through said detector;

means for performing in a computer calculation from the data obtained from the known specimen by mathematical evaluation to determine algebraic model parameters which characterize the flow system;

storage means for storing digital signals and said model parameter values characteristic of the flow system in digital form;

means for repetitively performing calculations in the computer on said data obtained from the interfacial zones of injected liquid samples to obtain values of a property of each sample; and

means responsive to said characteristic values of the model parameters for rapidly recording property values of the samples.

4,958,296

WATER-LEAKAGE DETECTING APPARATUS AND METHOD WHICH ARE LITTLE INFLUENCED BY NOISE

Susumu Saitoh; Syozo Tsuiguchi; Akio Enomoto, and Teruyoshi Matsuzawa, all of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 222,410, Jul. 21, 1988, abandoned. This application Jan. 31, 1990, Ser. No. 472,434
Claims priority, application Japan, Jul. 22, 1987, 62-180939
Int. Cl.[5] G01M *3/08*
U.S. Cl. 364—509 **18 Claims**

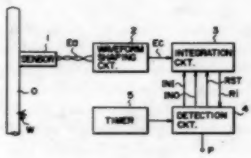
1. A water leakage detecting apparatus comprising:

vibration detection means for detecting a vibration generated due to water leakage;

integration means, connected to said detection means, for integrating over a predetermined time period each time

interval for which a vibration level of the vibration detected by said detection means exceeds a predetermined value, said integration means performing the integration over a plurality of said predetermined time periods to obtain a plurality of integration values; and

determination means for receiving the plurality of integration values calculated by said integration means, for selecting a minimum value of the plurality of integration values as an integration value obtained when an influence of noise is minimum, for comparing the selected minimum value with a preset reference value, and for, when the minimum value exceeds the reference value, determining a presence of water leakage, and when the minimum value is smaller than the reference value, determining an absence of water leakage.

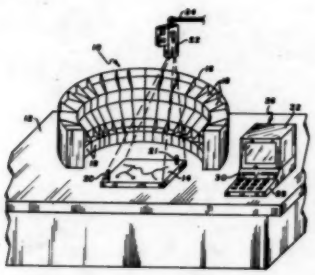


4,958,297

APPARATUS FOR INTERFACING VIDEO INFORMATION AND COMPUTER-GENERATED GRAPHICS ON A VISUAL DISPLAY TERMINAL

James K. Hansen, Minnetrista, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jul. 17, 1986, Ser. No. 887,901
Int. Cl.[5] G06F *15/42*
U.S. Cl. 364—518 **4 Claims**



1. A system for faciliatating the manufacture of finished subassemblies from component parts at a work station, comprising:

(a) a video camera positioned to view the area in said work station where said subassemblies are to be constructed;

(b) personal computing means located at said work station including manual data entry means and having an internal memory, an address bus, a data bus, a monitor output and a visual display terminal connected to said monitor output;

(c) external memory means addressable by said personal computing means for storing prestored data defining the positioning and the sequence of operations to be followed in selecting and joining said component parts in fabricating said subassemblies; and

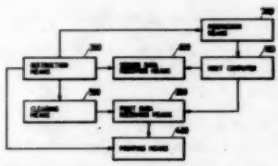
(d) selector means for coupling said video camera and said monitor output of said personal computing means to said visual display terminal for effectively simultaneously displaying both the pictorial image of said area in said work station being observed by said video camera and alpha/-numeric and graphics information originating at said personal computing means on said visual display terminal.

4,958,298

PRINTING APPARATUS HAVING MEANS FOR CLEARING UNWANTED PRINT DATA STORED IN AN INPUT BUFFER AND ABOLISHING ENSUING RESIDUAL PRINT DATA

Yuji Okamoto, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan

Filed Jul. 15, 1988, Ser. No. 219,383
Claims priority, application Japan, Jul. 16, 1987, 62-177872
Int. Cl.[5] G06F *15/00*
U.S. Cl. 364—519 **5 Claims**



1. A printing appartus of the type in which printing is carried out in accordance with data transmitted from a host computer wherein said host computer transmits a predetermined amount of data to said printing apparatus, comprising:

a first data receiving and storing means for receiving the data transmitted from a host computer and storing the same;

a printing means for carrying out printing in accordance with the data stored in said first data receiving and storing means;

an instruction means for issuing an instruction to halt the printing being carried out be said printing means, said printing means halting the printing in response to said instruction;

a clearing means responsive to said instruction for clearing said data stored in said first data receiving and storing means;

a second data receiving means for receiving the data transmitted from a host computer, said second data receiving means being activated only when said instruction is issued, wherein said first data receiving and storing means is deactivated when said second data receiving means is activated; and

a permission means for permitting a host computer to transmit a residual ensuing data of said predetermined amount of data to the second data receiving means, said permission means generating a permission signal when said instruction is issued, and wherein a host computer starts transmission of the residual ensuing data when said permission signal is received.

4,958,299

CONTROL DEVICE FOR USE WITH A DRAWING OUTPUT UNIT

Yukihisa Akada, Iwatsuki, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Jan. 6, 1989, Ser. No. 294,267
Claims priority, application Japan, Jun. 13, 1988, 63-145506
Int. Cl.[5] G06F *3/14*
U.S. Cl. 364—520 **11 Claims**

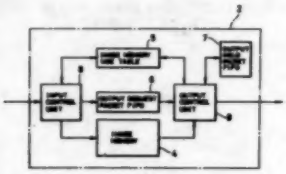
1. A control device for use with a drawing output unit for controlling the outputting of drawings, comprising:

image storing means for storing a plurality of image data of a set of drawings into predetermined memory areas in accordance with output sizes of the image data;

storing means for storing data indicative of memory locations and output sizes of each of the plurality of the image data of the set-of-drawings stored in the image storing means;

input control means for controlling the storing of the image data of the set of drawings into the predetermined memory areas of the image storing means in accordance with the output sizes, and for controlling the storing of the data indicative of the memory locations and the output sizes of each of the plurality of the image data of the set of drawings into the storing means; and

output control means for controlling the reading out of the



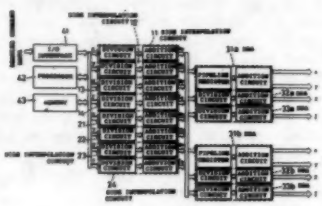
data indicative of the memory locations and the output sizes of the plurality of the image data of the set of drawings from the storing means, and when papers of a size corresponding to the read out size are absent in the drawing output unit, the output control means temporarily ceasing the transfer of the read out image data of the set of drawings to the drawing output unit, while selecting from among the read out data of the output sizes another image data of a set-of-drawings of an output size corresponding to an output size that the drawing output unit can output and controlling the transfer of the selected image data of the set of drawings from the image storing means to the drawing output unit.

4,958,300

POLYGON FILLING CONTROL APPARATUS

Tomoaki Ueda, Kyoto, Japan, assignor to Daikin Industries, Ltd., Osaka, Japan

Filed Oct. 20, 1988, Ser. No. 260,512
Claims priority, application Japan, Oct. 21, 1987, 62-266856
Int. Cl.[5] G06F *15/20*
U.S. Cl. 364—521 **8 Claims**



1. A polygon filling control apparatus, comprising:

an image memory unit;

a first linear interpolation operation means for dividing a polygon into line segments along the scanning line direction;

a second linear interpolation operation means for generating filling pixel data for every line segment and for writing the filling pixel data into said image memory unit as output data for display means;

said image memory unit including a plurality of block memories allotted for different line segments along the scanning line direction of the display means;

said second linear interpolation operation means including a plurality of linear interpolation operation units for generating filling pixel data for the different line segments along the scanning line direction, said block memories being allotted to each of the linear interpolation operation units and each of said linear interpolation operation units operating independently;

timing control means for generating, according to coordinate data supplied from said linear interpolation operation units, control signals for writing pixel data into said block memories concerned;

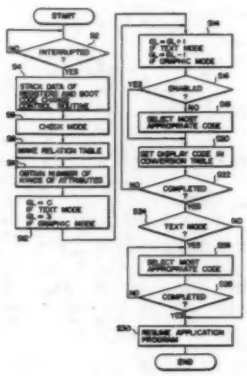
linear interpolation operation unit control means for generating control signals for selecting and controlling said linear interpolation operation units concerned, according to coordinate data of the different line segments in a direction at a right angle to the scanning line direction with the coordinate data being in reference to a reference arrangement associated with a display means.

4,958,301

METHOD OF AND APPARATUS FOR CONVERTING ATTRIBUTES OF DISPLAY DATA INTO DESIRED COLORS IN ACCORDANCE WITH RELATION

Hironobu Kobayashi, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 30, 1989, Ser. No. 330,481
Claims priority, application Japan, Mar. 30, 1988, 63-74533
Int. Cl.[5] G06F *3/153*
U.S. Cl. 364—521 **22 Claims**



1. An apparatus for displaying display data without color competition, comprising:

storage means for storing the display data, said display data having attributes assigned to portions of the display data in units of pixels;

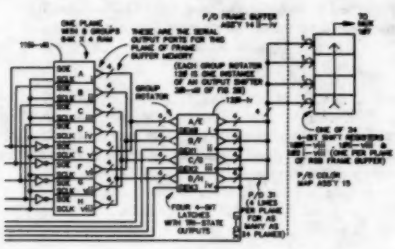
control means for determining in response to an input change instruction a relation between the display data portions and a corresponding size of an area of each display data portion, and for determining display code data in accordance with the relation and the sizes; and

display means for reading out the display data from said storage means, and displaying the display data with representations determined in accordance with the display code data.

4,958,302
GRAPHICS FRAME BUFFER WITH PIXEL SERIALIZING GROUP ROTATOR

Robert W. Fredrickson, and Monish S. Shah, both of Ft. Collins, Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 18, 1987, Ser. No. 86,744
Int. Cl.[5] G06F *3/14*
U.S. Cl. 364—521 **7 Claims**



1. A method of serializing the content of a graphics system frame buffer having a bit-plane per bit of pixel value, for each bit-plane the method comprising the steps of:

a. partitioning the frame buffer RAM's into groups containing equal numbers of RAM's;

b. applying separate addresses to each group;

c. storing n-many bits at each address in each group, n an integer greater than one determining the number of pixel values in each group;

d. partitioning the groups into first and second banks of equal numbers of groups;

e. simultaneously enabling all groups in the first bank, disabling the groups in the second bank, while applying selected addresses to each group and reading the data from those groups;

f. capturing the n-many bits from each group into associated n-bit latches;

g. for a selected ordering of the various n-bit latches, parallel loading a shift register with the outputs of each n-bit latch in the selected ordering, one n-bit latch at a time; while subsequently

h. shifting the shift register n-many times after each parallel load in step g to produce a serial bit stream representing n pixels;

i. simultaneously disabling all groups in the first bank, enabling all groups in the second bank, while applying the same addresses as in step e to all groups and reading the data from those groups;

j. repeating steps f, g and h subsequent to step i; and

k. combining the serial bit streams from each bit-plane into a sequence of multi-bit pixel values.

4,958,303
APPARATUS FOR EXCHANGING PIXEL DATA AMONG PIXEL PROCESSORS

Hamid Assarpour, Harvard, and Les Walton, Shrewsbury, both of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

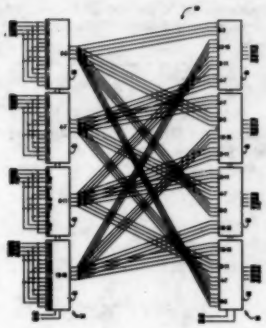
Filed May 12, 1988, Ser. No. 193,923
Int. Cl.[5] G06F *15/62*
U.S. Cl. 364—521 **21 Claims**

14. A method of swapping pixel data among a plurality of frame buffers in a computer graphics system having an arrangement of a plurality of pixel-processors with associated frame buffers comprising

providing switching circuitry connected to receive data from and return data to said pixel-processors, and

simultaneously receiving pixel data from each said pixel-processor at said switching circuitry and returning said pixel data to a selected one of said plurality of pixel-processors,

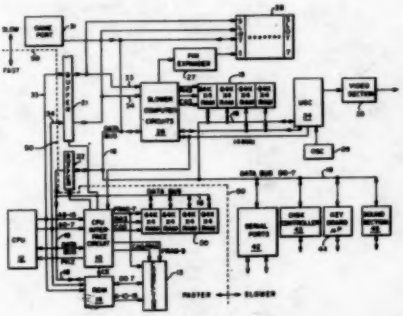
said first switching circuitry including a plurality of inputs and outputs, each said input being connected to a respective pixel processor to receive pixel data from it, each said output being connected to a respective pixel processor to return pixel data to it, said circuitry including electrical connections and switches therein permitting selective connection of any said input to any said output.



4,958,304
COMPUTER WITH INTERFACE FOR FAST AND SLOW MEMORY CIRCUITS

Robin B. Moore, Fremont, Calif., assignor to Apple Computer, Inc., Cupertino, Calif.

Continuation of Ser. No. 20,599, Mar. 2, 1987, abandoned. This application Sep. 12, 1989, Ser. No. 405,397
Int. Cl.[5] G06F *3/14, 15/20*
U.S. Cl. 364—521 **15 Claims**



1. A computer which provides a video signal for a display comprising:

a central processing unit (CPU) which executes a program to provide said video signal for said display;

first and second random-access memories (RAMs) couples to said CPU, both of said memories storing video data, and said CPU accessing said first RAM at a first rate and said second RAM at a second rate, said second rate being faster than said first rate;

video circuits coupled to said first and second RAM, and to said display for generating said video signal from said video data stored in said first RAM for said display, said

circuits accessing said first RAM at said first rate, said video data being updated and stored in both said first RAM and said second RAM;

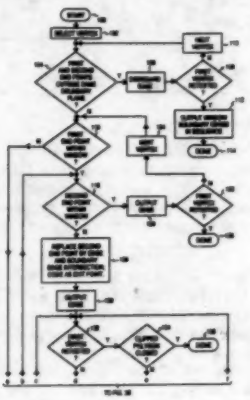
an interface means for providing control between said CPU and said first and second RAMs such that when said CPU is executing said program and needs to read said video data, said interface means causes said video data to read only said second RAM by said CPU thereby allowing said CPU to operate a substantial portion of its time at said second rate.

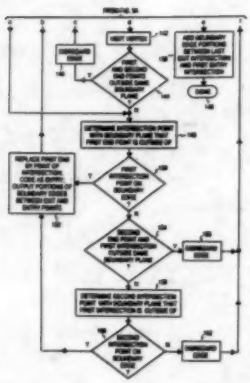
4,958,305

POLYGON EDGE CLIPPING

Thomas A. Piazza, Fort Orange, Fla., assignor to General Electric Company, Syracuse, N.Y.

Filed Nov. 4, 1987, Ser. No. 116,708
Int. Cl.[5] G06F *15/72*
U.S. Cl. 364—522 12 Claims





8. A method for forming a clipped figure from the interaction between a convex source polygon and a view window defined by boundary edges, wherein a respective boundary plane corresponding to each boundary edge so that the window lies inside each boundary plane, comprising:

determining a valid portion of edges of the source polygon in a predetermined direction around the perimeter of the source polygon that form a part of the perimeter of the clipped figure;

identifying in response to the valid portion of edges of the source polygon a derived portion of the boundary edges that forms another part of the perimeter of the clipped figure; and

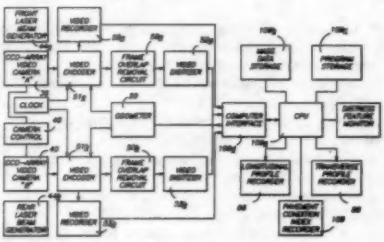
providing the valid portion and the derived portion so that the perimeter of the clipped figure may be sequentially defined in a predetermined direction along the perimeter of the clipped figure by adjoining valid and derived portions such that the derived portion lying between an exit intersection point of the valid portion and a next determined entry intersection point of the valid portion may be provided before determining the valid portion following the next determined entry intersection point.

4,958,306

PAVEMENT INSPECTION APPARATUS

Joseph P. Powell, Veradale; Donald L. Bender, Spokane; Sam C. Saunders, Pullman; Larry W. Purnell, and Anwar S. Khattak, both of Spokane, all of Wash., assignors to Pacific northwest research & Development, Inc., Spokane, Wash.

Filed Jan. 6, 1988, Ser. No. 141,248
Int. Cl.[5] G01B *11/00*; G01N *3/40*
U.S. Cl. 364—550 47 Claims



1. Pavement inspection apparatus for inspecting and determioing the surface condition of a length of pavement, comprising:

a surface vehicle for moving over the length of the pavement being inspected;

a pair of electromagnetic beam generators mounted on the vehicle for directing two spaced high intensity electromagnetic reference beams onto the pavement surface forming two horizontally spaced reference marks on the pavement surface that move over the surface as the vehicle is moved over the length of the pavement;

a first video camera mounted on the surface vehicle projecting toward the pavement surface having a first field of view of a segment of the pavement surface containing the two reference marks for optically inspecting the pavement for surface defects;

a second video camera mounted on the surface vehicle p spaced from the first video camera and projecting onto the pavement surface at an acute angle with respect to the first video camera having a second field of view that has at least a portion in common with the first field of view containing the two reference marks for optically inspecting the pavement for surface defects; and

video signal processing means operatively connected to the first and second video camera for determining the surface condition of the length of pavement travelled by the surface vehicle.

11. In a pavement inspection apparatus for inspecting and determining the surface condition of a length of pavement, comprising:

a surface vehicle for moving over the length of pavement being inspected;

a pair of electromagnetic beam generators mounted on the surface vehicle for directing two spaced electromagnetic

reference beams toward the pavement surface forming two spaced horizontal reference marks on the pavement surface as the surface vehicle moves over the length of pavement;

a first video camera means mounted on the surface vehicle and directed toward the pavement surface having a first field of view of the pavement containing the two reference marks for progressively generating electrical pixel video output data containing information of the condition of the pavement as the surface vehicle moves over the length of pavement;

surface to pixel calibration means operatively connected to the output of the first video camera for electrically monitoring the apparent horizontal distance between the two reference marks as observed by the camera as the vehicle moves over the length of pavement to calibrate the pixel data with surface distances and for determining any vertical movement of the camera with respect to the horizontal data reference plane and to modify the electrical pixel video output data in response to such vertical movement of the camera to substantially eliminate data errors caused by vertical movement of the camera with respect to the pavement surface, such as vehicle bounce; and

video signal processing operatively connected to the first video camera for electronically processing the electrical pixel video output data containing information of the condition of the length of pavement travelled by the surface vehicle.

31. Pavement inspection apparatus for determining the condition of a length of pavement, comprising:

a wheeled vehicle for moving over a length of the pavement in a longitudinal direction;

means on the wheeled vehicle for applying a preset vertical force through a wheel against the pavement to form a depression in the pavement beneath and extending rearward the wheel in a path travelled by the wheel as the vehicle is moved over the length of the pavement;

reference means on the vehicle for determining the undeflected elevation of the pavement along the wheel path;

a first wheel path video camera mounted on the vehicle having an X-Y field of view of the depression and extending rearward of the wheel for generating electrical video output data containing information of the deflected elevation of the depression at multiple sampling points in the X-Y field of view; and

deflection determining means operatively connected to the reference means and the first wheel path video camera and responsive to the electrical video output data for determining the deflection of the pavement in the X-Y field of view along wheel path as the vehicle moves over the pavement.

4,958,307

ROLL MARK INSPECTION APPARATUS

Seikichi Nishimura, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 18, 1988, Ser. No. 273,029

Claims priority, application Japan, Nov. 20, 1987, 62-293466; Nov. 20, 1987, 62-293467

Int. Cl.[5] G06F *15/20*; G01N *33/24*

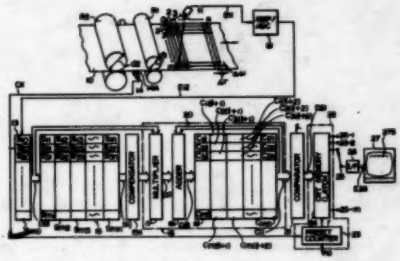
U.S. Cl. 364—551.01 **22 Claims**

1. A roll mark inspection apparatus, which is applied to a system for rolling and moving a strip material using reduction rolls, comprising:

surface state inspecting means for outputting an image signal representing a surface state of said strip material rolled and moved by said reduction rolls;

image information processing means connected to said surface state inspecting means for receiving the image signal output from said surface state inspecting means in synchronism with running of said strip material, performing predetermined processing to the received information, and outputting processed information;

comparing means connected to said image information processing means for comparing a predetermined comparison value, used to extract information corresponding to roll marks formed on the surface of said strip material by a speck of said reduction rolls, with the processed information output from said image information processing means, and outputting information discriminated from the processed information by the predetermined comparison value, and



display means connected to said comparing means for displaying an image corresponding to the discriminated information output from said comparing means each time said strip material runs by a predetermined distance corresponding to a circumferential length of said reduction rolls.

4,958,308

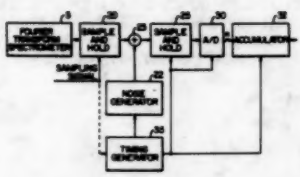
TECHNIQUE FOR IMPROVING THE RESOLUTION OF AN A/D CONVERTER

Raul Curbelo, Lexington, Mass., assignor to Bio-Rad Laboratories, Inc., Hercules, Calif.

Filed Oct. 21, 1988, Ser. No. 260,835

Int. Cl.[5] H03M *1/20*

U.S. Cl. 364—574 **7 Claims**



1. A method of digitizing the output signal from a Fourier transform spectrometer, comprising the steps of:

communicating an analog voltage level representing the output signal to a summing node;

superimposing random noise fluctuations having an average value of zero on the analog voltage level at the summing node to provide a fluctuating voltage signal centered at the analog voltage level and having a duration of at least a predetermined time interval;

sampling the fluctuating voltage signal a plurality of N times during the tim interval to provide a plurality of N voltages;

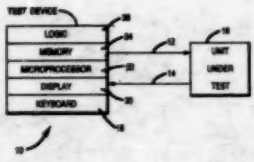
communicating the N voltages, one at a time, to the input of an A/D converter having a given resolution to provide N digitized values; and

averaging the N digitized values to provide an output with a digitization error reduced by a factor of $N^{\frac{1}{2}}$.

4,958,309
APPARATUS AND METHOD FOR CHANGING FREQUENCIES

Randy J. Turkal, Warsock, Ohio, assignor to NRC Corporation, Dayton, Ohio

Filed Jan. 30, 1989, Ser. No. 304,050
Int. Cl.[5] G05B 19/02
U.S. Cl. 364—580 14 Claims



1. Frequency control apparatus for providing a selected one of two frequencies to a microprocessor comprising, in combination:

first frequency generating means capable of generating a signal having a first frequency;

second frequency generating means capable of generating a signal having a second frequency;

a microprocessor to which signals of said first frequency or said second frequency are selectively applied;

logic circuit means for selectively gating a signal from either said first frequency generating means or said second frequency generating means to said microprocessor;

flip-flop means for controlling said logic circuit means and having a first input coupled to an output of said microprocessor;

address decoder means controlled by said microprocessor and coupled to a second input of said flip-flop means;

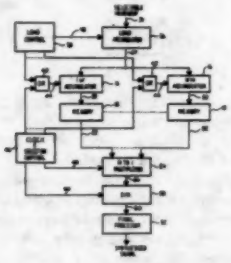
memory means coupled to said microprocessor to provide data to said microprocessor for control thereof; and

reset means controlled by said address decoder means and coupled to said microprocessor for resetting said microprocessor.

4,958,310
DIGITAL FREQUENCY SYNTHESIZER HAVING MULTIPLE PROCESSING PATHS

Bar-Giora Goldberg, 8401 Aero Dr., San Diego, Calif. 92123

Filed Nov. 19, 1987, Ser. No. 122,946
Int. Cl.[5] G06F 1/02
U.S. Cl. 364—718 10 Claims



1. A frequency synthesizer comprising:

(a) a plurality of processing paths to provide synthesis information in real-time about a signal being synthesized, each path providing a portion of the total information required to synthesize the signal, each processing path comprising:

(1) a selectable-increment counting means for producing a progressive series of counts in response to a train of clock signals, and (2) a memory means containing a plurality of data words and operative to recall and output a data word in response to and associated with each count, each data word containing signal synthesis information about a signal being synthesized,

(b) means for time ordering the information from the processing paths into an ordered data word stream,

(c) a means for converting the data word stream into the signal being synthesized,

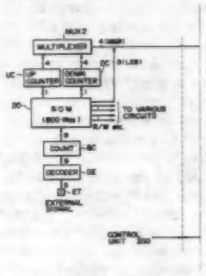
(d) means for progressively offsetting the counts in the respective paths' counting means at the start of synthesis in relation to each other by integer multiples of an increment derived from the frequency of the signal being synthesized, and

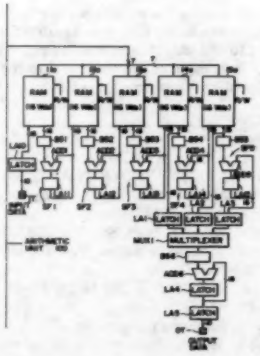
(e) means for providing during synthesis a constant increment for all of the paths' counting menas equal to the number of paths times the derived increment.

4,958,311
COMPOSITE FINITE IMPULSE RESPONSE DIGITAL FILTER

Yukio Kadowaki, Minoo; Shigeki Matsuoka, Suita, and Shogo Nakamura, Matsudo, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Mar. 27, 1989, Ser. No. 328,970
Claims priority, application Japan, Mar. 25, 1988, 63-72788
Int. Cl.[5] G06F 15/31
U.S. Cl. 364—724.01 5 Claims





1. A composite finite impulse response digital filter including a cascade arrangement of sub-filters, and a first latch for storing data input into a first one of said sub-filters, each of said sub-filters comprising:

a barrel shifter which in the case of the first sub-filter in the cascade shifts data output from said first latch and in the case of each other sub-filter in the cascade shifts data output from the preceding sub-filter in the cascade, wherein each barrel shifter shifts the respective data input thereto to a selected one of the least significant bit side and

the most significant bit side of the data over a number of shifts corresponding to a first control signal;

first adding means having first and second input terminals for adding data input into the first input terminal from the respective barrel shifter and data input into the second input terminal; and

second storing means for temporarily storing data output from said first adding means and outputting said data thus stored to the second input terminal of said first adding means and also, in the case of all but the last sub-filter in the cascade, to an input terminal of the next sub-filter in the cascade;

wherein an output terminal of a preceding sub-filter is connected to an input terminal of the next sub-filter to have said sub-filters connected in series; and

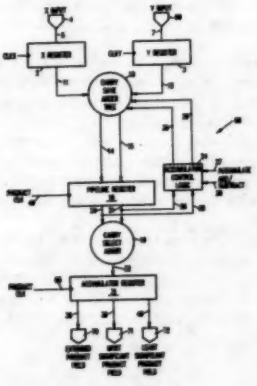
said digital filter including a multiplying and adding means for multiplying data output from each of a selected number of said sub-filters by a multiplier factor corresponding to a second control signal and adding the thus multiplied data to produce added data which in turn are output as output data of said cascade.

4,958,312

DIGITAL MULTIPLIER CIRCUIT AND A DIGITAL MULTIPLIER-ACCUMULATOR CIRCUIT WHICH PRELOADS AND ACCUMULATES SUBRESCULTS

Peng-Hust Ang, Los Altos, and Charles C. Stearns, Palo Alto, both of Calif., assignors to LSI Logic Corporation, Milpitas, Calif.

Filed Nov. 9, 1987, Ser. No. 118,496
Int. Cl.[5] G06F 7/48
U.S. Cl. 364—754 **9 Claims**



6. A digital multiplier-accumulator circuit comprising:

first and second input registers, each having an input and an output;

a carry save adder tree circuit having a first input circuit connected to the output of said first and second input registers, and having a second input circuit, and an output circuit;

a pipeline register having an input and an output;

means connecting the input of said pipeline register to the output circuit of said carry save adder tree;

accumulator control logic means having an input connected to the output of said pipeline register, and having an output connected to said second input circuit of said carry save adder tree;

a second adder circuit having an input connected to the output of said pipeline register, and having an output;

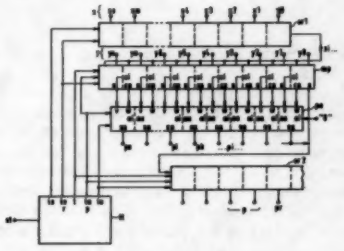
an accumulator register having an input connected to the output of said second adder circuit, and having an output for providing output data.

4,958,313

CMOS PARALLEL-SERIAL MULTIPLICATION CIRCUIT AND MULTIPLYING AND ADDING STAGES THEREOF

Arnold Uhlenhoff, Emmendingen, Fed. Rep. of Germany, assignor to Deutsche ITT Industries GmbH, Freiburg, Fed. Rep. of Germany

Filed Feb. 6, 1989, Ser. No. 307,125
Claims priority, application European Pat. Off., Mar. 19, 1988, 88104413
Int. Cl.[5] G06F 7/52
U.S. Cl. 364—757 **20 Claims**



1. An integrated multiplication circuit, for binary multiplication of a multiplicand of M bits and a multiplier of N bits where M and N are a positive integer, comprising:

an input shift register receiving the M bits of the multiplicand in parallel and reading out the M bits serially when clocked by an internal clock signal;

a single chain having a plurality of multiplying stages, wherein each multiplying stage receives a respective one of the N bits of the multiplier at one input and each of the M bits of the multiplicand in succession at another input, and performs partial product multiplications successively between said respective one bit of the multiplier and each of the M bits of the multiplicand when they are serially read-out from said input shift register so as to output respectively-derived sum and carry bit outputs;

a parallel adder having a plurality of adding stages corresponding to respective ones of said plurality of multiplying stages, wherein each adding stage receives in parallel the sum bit output of one of said multiplying stages at one input and the carry bit output of a next adjacent one of said multiplying stages at an other input, and adds the received inputs successively and outputs a respective sum bit output;

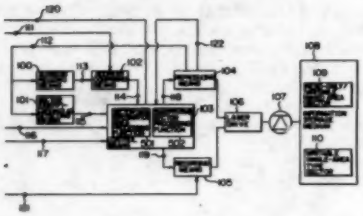
an output shift register for serially receiving the sum bit outputs from said parallel adder when clocked by said internal clock signal; and

a clock driver for providing said internal clock signal for clocking the operation of said multiplication circuit in accordance therewith.

4,958,314
INFORMATION RECORDING/REPRODUCING APPARATUS

Yoshihiko Imai, Hirakata; Yoshio Nakano, Takatsuki; Makoto Ando, Itami; Yoshiyuki Iwanaura, Ibaraki, and Takashi Ishida, Kadoma, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Feb. 11, 1987, Ser. No. 13,407
Claims priority, application Japan, Feb. 18, 1986, 61-34527; Feb. 18, 1986, 61-34528; Jun. 20, 1986, 61-145102
Int. Cl.[5] G11B *19/02*
U.S. Cl. 364—900 9 Claims



1. An information recording/reproducing apparatus comprising:

an information storage medium having a plurality of tracks divided into a plurality of sectors of first and second types, a first type sector having a sector identification section, a read/write data section and a read-only data section, and a second type sector having a sector identification section and a read/write data section, said sector identification section of each type sector including a sector type identification flag for identification of the respective sector type and a record state identification flag for identification of record state of the respective type sector as a "not-updated" state or as an "already-updated" state;

reproducing means for reproducing information from said first and second type sectors;

recording means for recording information into said first and second type sectors; and

control means for controlling said reproducing means in an information reproducing mode so that:

(a) information is reproduced from said read-only data section of a selected said first type sector when a selected first type sector is detected as having a "not-updated" state,

(b) information is reproduced from said read/write data section of a selected first type sector when a selected first type sector is detected as having an "already-updated" state, and

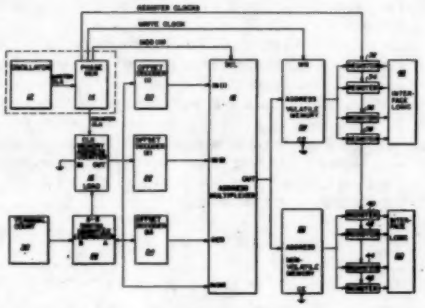
(c) information is reproduced from said read-only data data section of a selected second type sector when said second type sector is detected;

said control means controlling said recording means in an information recording mode so as to change information in said sector identification section of a selected first type sector into information representing a "first type sector" and an "already-updated" state and to record information into said read/write data section of a selected first type sector when the information in the sector identification section thereof represents the "first type sector", and to record information into said read/write data section in a selected second type sector when the information in said sector identification section of a selected second type sector represents the "second type sector".

4,958,315
SOLID STATE ELECTRONIC EMULATOR OF A MULTIPLE TRACK MOTOR DRIVEN ROTATING MAGNETIC MEMORY

Kris S. Balch, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 2, 1985, Ser. No. 751,350
Int. Cl.[5] G06F *3/00, 12/00*
U.S. Cl. 364—900 17 Claims



1. A system for emulating the memory characteristics of a motor-driven rotating magnetic drum memory having a plurality of data storage channels on said drum and multiple magnetic heads per data storage channel, each of said data storage channels being positioned circumferentially adjacent to at least one of said other data storage channels comprising:

means for emulating said multiple magnetic heads per each said data storage channel on said magnetic drum and for emulating a physical separation between each of said multiple magnetic heads per each said data storage channel comprising:

a clock;

first means connected to said clock for electronically emulating the rotational timing characteristics of said rotating magnetic drum memory and for generating a series of data address signals;

second means connected to said first means for receiving said series of data address signals and for changing each of said series of data address signals by a predetermined amount to thereby generate a new series of data address signals;

third means connected to said second means for electronically emulating said plurality of data storage channels; and

fourth means connected to said third means for electronically emulating said multiple magnetic heads.

4,958,316
STATIC RANDOM ACCESS MEMORY

Kiyofumi Ochii, Yokohama; Masataka Matsui, Tokyo, and Osamu Ozawa, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 22, 1988, Ser. No. 288,199
Claims priority, application Japan, Dec. 23, 1987, 62-325688
Int. Cl.[5] G11C *13/00*
U.S. Cl. 365—63 8 Claims

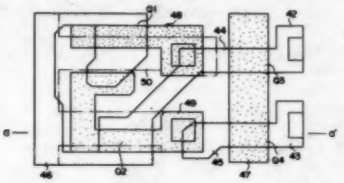
2. A static random access memory comprising:

a semiconductor substrate;

a well region formed in the substrate and containing at least one memory cell;

bias-voltage generating means connected to the well region

for generating a bias voltage to be applied to the well region; and



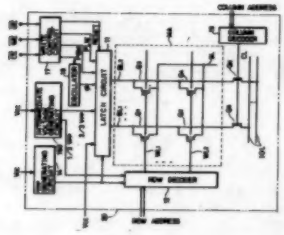
a bonding pad formed on the substrate, to which a control signal for controlling the bias-voltage generated by the bias-voltage generating means is supplied.

4,958,317

NONVOLATILE SEMICONDUCTOR MEMORY DEVICE AND A WRITING METHOD USING ELECTRON TUNNELING

Yasushi Terada; Kazuo Kobayashi, and Takeshi Nakayama, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 27, 1988, Ser. No. 224,743
Claims priority, application Japan, Jul. 27, 1987, 62-187962
Int. Cl.[5] G11C *7/00, 16/02*
U.S. Cl. 365—104 **10 Claims**



1. A nonvolatile semiconductor memory device comprising a memory cell array in which a plurality of word lines and a plurality of bit lines are arranged intersecting with each other, a memory cell being arranged at each of the intersections of the word lines and bit lines, each memory cell formed of one memory transistor having a floating gate, a word line connected to each control gate electrode of each of the memory transistors in the same row and a bit line connected to each drain electrode of each of the memory transistors in the same column, for storing information in each memory cell in a nonvolatile manner, said device comprising:

means for generating a high voltage selected to be higher than the ground voltage and sufficient to generate electron tunneling in said memory transistor;

means for generating at least one intermediate voltage selected to be higher than the ground voltage and lower than said high voltage, with at least one of the differences between the intermediate voltage and the ground voltage and between the intermediate voltage and said high voltage being insufficient to generate electron tunneling in said memory transistor;

latch means for storing data for at least one of said word lines to be written in said memory transistor; and

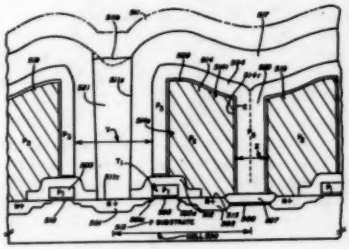
data writing means for simultaneously writing data stored in said latch means in said plurality of memory transistors connected to a word line selected by an address signal, by applying the ground voltage, said high voltage and said intermediate voltage to said word line and said bit line such that the electron tunneling is generated only in the memory transistor specified by the externally inputted address signal and the stored content of said latch means in data writing.

4,958,318

SIDEWALL CAPACITOR DRAM CELL

Eliyahou Harari, 2320 Friars La., Los Altos, Calif. 94022

Filed Jul. 8, 1988, Ser. No. 216,873
Int. Cl.[5] G11C *7/00, 11/24*; H01L *29/78*
U.S. Cl. 365—149 **53 Claims**



1. A semiconductor storage capacitor structure comprising:

a semiconductor substrate having a top surface;

a first conductive layer formed above said top surface of said semiconductor substrate, and serving as first electrode of said capacitor, said first conductive layer having a top surface;

a trench formed into said first layer but not into said semiconductor substrate, said trench having substantially vertical sidewalls positioned above said top surface of said semiconductor substrate;

a layer of storage dielectric formed on said sidewalls of said trench and on at least a portion of said top surface of said first conductive layer; and

a second conductive layer formed on said layer of dielectric and serving as a second electrode of said capacitor,

wherein the capacitance from said sidewalls is at least as large as the capacitance from said top surface of said first conductive layer.

4,958,319

ADDRESS AMPLIFIER CIRCUIT HAVING AUTOMATIC INTERLOCK AND PROTECTION AGAINST MULTIPLE ADDRESSING FOR USE IN STATIC GAAS RAMS

Paul-Werner von Basse, Wolfratshausen; Jean-Marc Dortu, Munich; Andrea Herlitzek, Munich; Dieter Kohlert, Munich, and Ulrich Schaper, Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 19, 1989, Ser. No. 409,578
Claims priority, application Fed. Rep. of Germany, Oct. 14, 1988, 3835116
Int. Cl.[5] G11C *11/00*
U.S. Cl. 365—154 **2 Claims**

1. An address amplifier circuit for static RAMs having an address signal line (ADR), a first output signal line (A) and a second output signal line ($\overline{A}$), comprising:

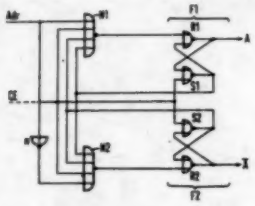
a first flip flop (F1) having a first reset logic element (R1) and a first set logic element (S1), and a second flip flop (F2) having a second reset logic element (R2) and a second set logic element (S2);

a first NOR logic element (N1) and a second NOR logic element (N2);

a chip-enable signal line (CE) connected respectively to first inputs of the first NOR logic element (N1), of the second NOR logic element (N2), of the first set logic element (S1) and of the second set logic element (S2);

the address signal line (ADR) connected to a second input of the first NOR logic element (N1) and, via an inverter (n), to a second input of the second NOR logic element (N2);

outputs of the first set logic element (S1) and of the second



set logic element (S2) respectively connected to third and fourth inputs of the first NOR logic element (N1) and of the second NOR logic element (N2);

an output of the first NOR logic element (N1) connected to a first input of the first reset logic element (R1) and an output of the second NOR logic element (N2) connected to a first input of the second reset logic element (R2); and

an output of the first reset logic element (R1) connected to the first output signal line (A) and an output of the second reset logic element (R2) connected to the second output signal line ($\overline{A}$).

4,958,320

RADIATION RESISTANT BIPOLAR MEMORY

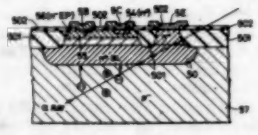
Noriyuki Homma, Kodaira; Tohru Nakamura, Tanashi; Kazuo Nakazato, Kokubunji; Motoaki Matsumoto, Ome; Tetsuya Hayashida, Hinodemachi; Masaharu Kubo, Hachioji, and Kazuhiko Sagara, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 42,698, Apr. 27, 1987, which is a continuation-in-part of Ser. No. 792,286, Oct. 28, 1985. This application Jun. 2, 1989, Ser. No. 361,633

Claims priority, application Japan, Oct. 29, 1984, 59-225738; Oct. 29, 1984, 59-225737; Oct. 29, 1984, 59-225736; Oct. 31, 1984, 59-227730; Mar. 20, 1985, 60-54404; Apr. 30, 1986, 61-97929

Int. Cl.[5] G11C *11/40*

U.S. Cl. 365—174 **30 Claims**



1. A semiconductor device comprising:

a semiconductor substrate;

memory cells, each of which comprises first and second inverse-mode bipolar transistors cross-coupled with each other, provided on the semiconductor substrate, and first and second load devices provided on the semiconductor substrate;

word lines for selecting the memory cells, provided on the semiconductor substrate;

bit lines for reading and writing information of the memory cells, provided on the semiconductor substrate; and

coupling devices for electrically coupling the bit lines and memory cells, provided on the semiconductor substrate

wherein:

the first inverse-mode bipolar transistors comprise buried layers,

the second inverse-mode bipolar transistors comprise buried layers,

the first load devices comprise buried layers,

the second load devices comprise buried layers,

the buried layers of the first inverse-mode bipolar transistors are isolated from the buried layers of the first and second load devices,

the buried layers of the second inverse-mode bipolar transistors are isolated from the buried layers of the first and second load devices;

the first inverse-mode bipolar transistors employ the buried layers as emitters, and

the second inverse-mode bipolar transistors employ the buried layers as emitters.

4,958,321

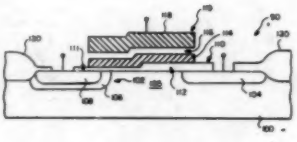
ONE TRANSISTOR FLASH EPROM CELL

Chi Chang, Redwood City, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Sep. 22, 1988, Ser. No. 247,887

Int. Cl.[5] G11C *11/40*

U.S. Cl. 365—185 **27 Claims**



1. An electrically programmable and erasable semiconductor device, provided on a substrate, comprising:

a drain region provided in the substrate;

a source region provided in the substrate, said source region comprising a first lightly doped source region and a second heavily doped source region provided in said first source region and being spaced from said drain region to define a channel region therebetween;

dielectric means for limiting tunnelling during programming and allowing tunnelling during erasing, said dielectric means comprising a tunnelling dielectric having a first thickness provided on a portion of the substrate corresponding to the position of a portion of said source region and a gate oxide having a second thickness greater than said first thickness provided on a portion of the substrate corresponding to the position of a portion of said channel and a portion of said drain region;

a floating gate provided on said dielectric means;

an inter-gate dielectric provided on said floating gate; and

a control gate provided on said inter-gate dielectric.

4,958,322

SEMICONDUCTOR PSEUDO MEMORY MODULE

Ryuichi Kosugi, and Tsugio Tabaru, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 6, 1989, Ser. No. 376,067

Claims priority, application Japan, Jul. 6, 1988, 63-168424

Int. Cl.[5] G11C *13/00*

U.S. Cl. 365—189.01 **4 Claims**

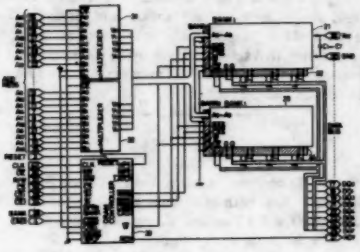
1. A semiconductor pseudo memory module in which func-

tions of a static random access memory are provided by a dynamic random access memory, comprising:

a multilayer wiring substrate having external connection terminals;

a plurality of dynamic random access memory devices mounted on said substrate;

a semiconductor multiplexing device mounted on said substrate for converting address signals applied to said con-



nection terminals into address signals compatible to said dynamic random access memory devices; and

a semiconductor refresh control device mounted on said substrate and responsive to signals applied to said external dynamic random access memory;

at least two of said dynamic random access memory devices, said multiplexing device and said refresh control device being interconnected through multiple wiring layers of said substrate.

4,958,323

SEMICONDUCTOR FILE MEMORY

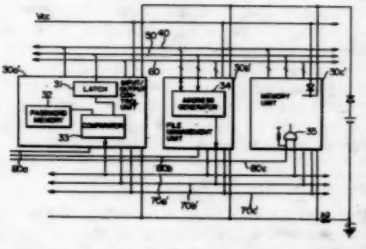
Ken Sugawara, Ibaraki; Katsujiro Nakamura, Toride; Mikio Matoba, Ibaraki, and Shigeru Sakairi, Tsukuba, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

Filed Sep. 13, 1988, Ser. No. 243,837

Claims priority, application Japan, Sep. 14, 1987, 62-230070

Int. Cl.[5] G11C *13/00*

U.S. Cl. 365—189.01 **5 Claims**



1. A semiconductor file memory, used as an external memory for an information processor such as an arithmetic processor, comprising:

interface means for transacting data with said information processor;

a plurality of memory units each including semiconductor memory devices mounted on a substrate and having identical terminal assignments in connection commonly to a bus of said interface means through a connector;

a control circuit unit having identical terminal assignments as said connectors of said memory units and operating to control said memory units by taking the place of at least one of said memory units; and

a selection circuit for selecting one of said memory units or said control circuit unit which has taken the place of a memory unit in response to a signal from said interface means.

4,958,324

METHOD FOR THE TESTING OF ELECTRICALLY PROGRAMMABLE MEMORY CELLS, AND CORRESPONDING INTEGRATED CIRCUIT

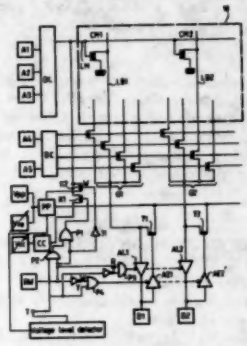
Jean Devin, Aix En Provence, France, assignor to SGS-Thomson Microelectronics SA, Gentilly, France

Filed Nov. 9, 1988, Ser. No. 269,169

Claims priority, application France, Nov. 24, 1987, 87-16236

Int. Cl.[5] G11C *13/00*; G06F *11/00*

U.S. Cl. 365—201 **9 Claims**



1. A method for the testing of an electrically programmable memory comprising cells addressable in reading an in programming mode by word lines, the binary state of the cells being capable of being read or written from bit lines, and a programming terminal being provided to receive and apply, to a bit line, a higher programming voltage than the voltages applied in reading mode, wherein said method, in order to est a cell, a read voltage is applied to a word line, the bit line is connected to the programming terminal, said programming terminal is connected to a source of test voltage with a much lower value than that of the programming voltage and a current flowing between this terminal and the test voltage source is measured.

4,958,325

LOW NOISE SEMICONDUCTOR MEMORY

Yoshinobu Nakagome, Albany, Calif.; Kiyoo Itoh, Higashikurume, Japan; Masakazu Aoki, Tokorozawa, Japan; Shin'ichi Ikenaga, Koganei, Japan; Masashi Horiguchi, Kokubunji, Japan, and Hitoshi Tanaka, Tachikawa, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 31, 1988, Ser. No. 238,375

Claims priority, application Japan, Sep. 4, 1987, 62-220224; Sep. 18, 1987, 62-232116

Int. Cl.[5] G11C *7/00, 7/02, 11/404*

U.S. Cl. 365—206 **26 Claims**

1. A semiconductor memory comprising:

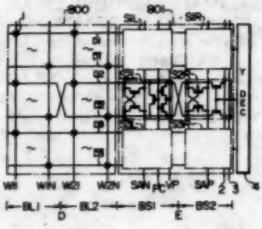
a plurality of pairs of data lines arranged in substantially parallel relationship with each other, respective pairs having substantially the same electric characteristics;

a plurality of word lines arranged to extend perpendicularly to said data line pairs;

at least one memory cell connected to at least one of intersections of said word lines with data lines of said pairs; and

a plurality of sense amplifier means for differentially detecting signals appearing on each data line pair, said amplifier means electrically connected to said data line pairs,

wherein each of the plurality of sense amplifier means comprises a first sense amplifier that drives one of the data lines in the pair to a low-level voltage and a second sense amplifier that drives the other of the data lines in the pair to a high-level voltage, and the data lines of at least one of



said plural data line pairs are transposed in location at a predetermined place along a length of said data line pair, and, said sense amplifier means is operative to change symmetrically voltage on one of the data lines of a pair to a high-level voltage and voltage on the other of the data lines of the pair to a low-level voltage.

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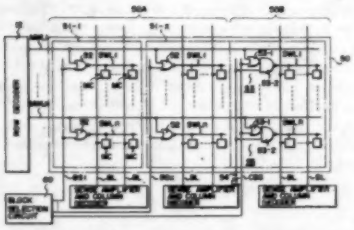
SEMICONDUCTOR MEMORY DEVICE HAVING A FUNCTION OF SIMULTANEOUSLY CLEARING PART OF MEMORY DATA

Takayasu Sakurai, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 22, 1988, Ser. No. 274,555
Claims priority, application Japan, Nov. 30, 1987, 62-302678
Int. Cl.[5] G11C *7/00*
U.S. Cl. 365—218 **19 Claims**



1. A semiconductor memory device comprising:

a first memory cell array section having memory cells arranged in a matrix form;

row decoder means for selecting rows of the memory cells in said first memory cell array section;

first column decoder means for selecting columns of the memory cells in said first memory cell array section;

a second memory cell array section having memory cells arranged in a matrix form whose rows correspond to those of said first memory cell array section;

second column decoder means for selecting columns of the memory cells in said second memory cell array section, said second column decoder means selecting one of the columns in said second memory cell array section in the normal operation mode when none of the columns of the memory cells in said first memory sell array section is selected by said first column decoder means, selecting none of the columns of said second memory cell array section when any one of the columns of the memory cells in said first memory cell array section is selected by said first column decoder means, and selecting all of the columns of said second memory cell array section when the same data is simultaneously written into all the memory cells in said second memory cell array section; and

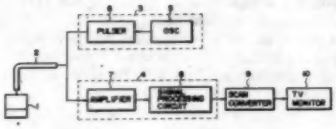
logic gate means, provided between corresponding rows of the memory cells of said first and second memory cell array sections, for connecting the rows of the memory cells in said first memory cell array section to respective rows of the memory cells in said second memory cell array section in the normal operation mode so as to permit an output from said row decoder means to be transmitted to said second memory cell section, and for setting each of the rows of the memory cells in said second memory cell array section to a selected level when the same data simultaneously written into all the memory cells in said second memory cell array section.

4,958,327

ULTRASONIC IMAGING APPARATUS

Shiroh Saitoh, Yokohama; Mamoru Izumi, Tokyo; Syuzi Suzuki, and Kazuhide Abe, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 31, 1988, Ser. No. 238,399
Claims priority, application Japan, Aug. 31, 1987, 62-216660
Int. Cl.[5] G01S *15/00*
U.S. Cl. 367—7 **14 Claims**



1. An ultrasonic imaging apparatus comprising:

ultrasonic transducer means for outputting an ultrasonic beam and converting an echo of the ultrasonic beam into an echo signal;

transmitting means for supplying a drive signal to said ultrasonic transducer means to cause said ultrasonic transducer means to output the ultrasonic beam;

receiving means for receiving the echo signal output from said ultrasonic transducer means and converting the echo signal into an image signal; and

cable means, having a predetermined capacitive impedance, for coupling said ultrasonic transducer means to said transmitting and receiving means so as to transmit the drive and echo signals,

wherein said ultrasonic transducer means comprises an ultrasonic transducer having a capacitive impedance of about 70 to 120 ohms lower than that of said cable means and is coupled without an impedance converter to said transmitting and receiving means.

4,958,328

MARINE WALKAWAY VERTICAL SEISMIC PROFILING

Steven A. Stubblefield, Houston, Tex., assignor to Texaco Inc., White Plains, N.Y.

Filed Jul. 24, 1989, Ser. No. 383,472
Int. Cl.[5] G01V *1/38*
U.S. Cl. 367—15 **11 Claims**

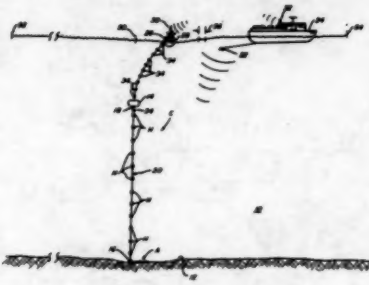
1. A method of marine vertical seismic profiling, comprising the steps of:

(a) locating a marine seismic cable having plural hydrophones in a substantially vertical position in a body of water;

(b) towing a seismic source behind a vessel along a seismic line of profile past the seismic cable;

(c) activating the seismic source at periodic intervals corresponding to shotpoint intervals to emit seismic waves into subsurface formations beneath the body of water;

(d) sensing the response of the subsurface formations to the emitted seismic waves with the plural hydrophones; and



(e) recording the sensed response of the hydrophones as seismic data.

4,958,329

HYDROPHONE AND ARRAY THEREOF

Richard A. Marschall, 42 Glenwood Dr., Smithtown, N.Y. 11787

Filed Feb. 13, 1989, Ser. No. 310,301
Int. Cl.[5] G01V *1/38*
U.S. Cl. 367—20 **16 Claims**

1. A low noise hydrophone of the type towed by a cable comprising:

a hydrodynamically smooth shape, having a nose section further comprising a smoothly increasing cross-sectional diameter from a point of attachment to said towing cable to a point of maximum cross-sectional diameter, having a smoothly decreasing cross-sectional diameter from said point of maximum cross-sectional diameter to a point of attachment to a tail bridle, defining a tail section thereof;

said point of maximal cross-sectional diameter being located substantially closer to said tail bridle attachment than to said point of attachment to said towing cable; and

an active hydrophone acoustic sensor within said hydrophone being located substantially forward of said point of maximal cross-sectional diameter.

4,958,330

WIDE ANGULAR DIVERSITY SYNTHETIC APERTURE SONAR

Francis J. Higgins, Panama City, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

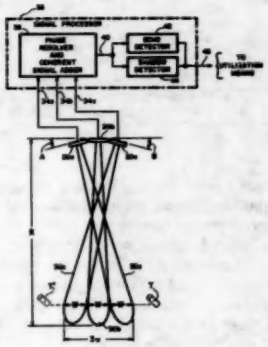
Filed Nov. 3, 1980, Ser. No. 208,086
Int. Cl.[5] G01S *15/00*
U.S. Cl. 367—88 **8 Claims**

1. A side-looking sonar apparatus comprising:

vehicle means for travel along a path of forward movement;

a plurality of electro-acoustic transducers carried by said vehicle and each adapted to generate a plurality of electrical signals corresponding to received acoustic energy reflected within corresponding ones of a plurality of response beams each having a narrow fore-and-aft dimension;

said transducers being disposed at small angles relative to one another, whereby said beams cross one another at an intermediate location between their origin and the maximum range of said apparatus, and the distal portions of said beams lie adjacent to one another, whereby an object in the range of said distal positions is swept successively by said beams; and



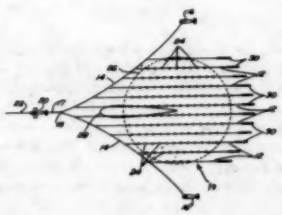
signal processing means, responsive to said plurality of electrical signals, for combination thereof to provide output signals characteristic of the presence of said objects.

4,958,331

TOWED SONAR RECEIVING ARRAY

William F. Wardle, Mystic, Conn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 25, 1974, Ser. No. 446,573
Int. Cl.[5] G01S *15/00*
U.S. Cl. 367—130 **8 Claims**



1. A sonar surveillance configuration suitable for towing comprising:

a plurality of receiving devices arranged in a populated circle with random spacing between said receiving devices;

control means connected to said receiving devices for maintaining the arranged configuration, said control means further comprises a pair of spreader lines connected to each other at one end, a pair of paravanes connected to the respective other ends of said spreader lines for positioning said spreader lines, and a plurality of spaced lines connected to said spreader lines and arranged so that said spaced lines are parallel to each other when towed; and

towing means suitable for being connected to said control means.

4,958,332

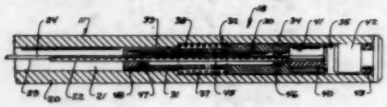
DAMPING DEVICE FOR SONIC WAVEGUIDES

Jacob Tellerman, Bayside, N.Y., assignor to MTS Systems Corporation, Eden Prairie, Minn.

Filed Sep. 11, 1989, Ser. No. 405,473

Int. Cl.[5] H04R *15/00*

U.S. Cl. 367—140 **12 Claims**



1. A damping device for a vibrating elongated member comprising a housing having an interior chamber, said elongated member comprising a magnetostrictive waveguide having vibrations induced therein, means mounting said housing on said elongated member with the interior chamber open to the elongated member, and a filling of viscous material in said interior chamber having a desired mass density and coupled to the elongated member for absorbing energy of vibrations of said elongated member within said chamber.

4,958,333

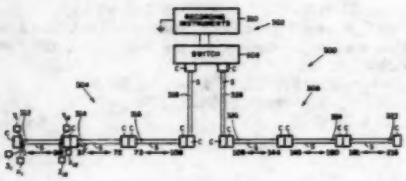
SHIELDING FOR SEISMIC CABLES

John T. O'Brien, San Antonio, Tex., assignor to Southwest Research Institute, San Antonio, Tex.

Filed Jan. 12, 1989, Ser. No. 297,453

Int. Cl.[5] H01B *11/06*

U.S. Cl. 367—154 **6 Claims**



2. A method for shielding a seismic cable in a seismic data acquisition system utilizing a plurality of sensors, wherein said cable has a plurality of wire pairs therein, comprising the steps of:

selectively activating selected ones of said wire pairs; and

simultaneously grounding other ones of said wire pairs such that said grounded wire pairs are distributed in a substantially uniform manner across a cross-section of said cable.

4,958,334

BRACELET OF METALLIC CONSTRUCTION AND WATCH PROVIDED WITH SUCH A BRACELET

Laurent Grosjean, Neuchâtel, Switzerland, assignor to ETA SA Fabriques d'Ebauches, Grenchen, Switzerland

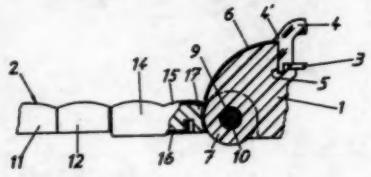
Filed Aug. 23, 1989, Ser. No. 397,733

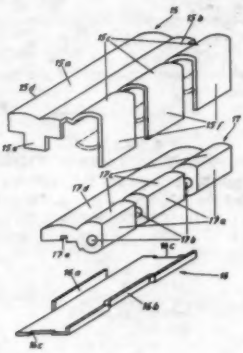
Claims priority, application Switzerland, Aug. 24, 1988, 03143/88

Int. Cl.[5] G04B *37/00*

U.S. Cl. 368—282 **8 Claims**

1. A watch including a case body of plastic material and a bracelet including two strands each of which is coupled to the case body by a hinge, said hinge including a first hinge knuckle integral with the case body and formed of the same material and a second hinge knuckle of plastic material, said bracelet being of metal, said second hinge knuckle being rigidly fixed to





and confined within a hollow metallic link forming a metallic end part of the bracelet.

4,958,335

OPTICAL HEAD ASSEMBLY WITH A MINIMUM OF INERTIA AND FEASIBLE FOR HIGH HIGH-SPEED ACCESS

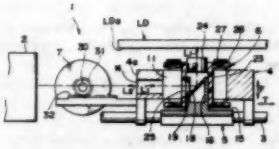
Takayuki Takeda; Hiroshi Masaki, and Isamu Nose, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Japan

Filed Dec. 19, 1988, Ser. No. 286,723

Claims priority, application Japan, Dec. 23, 1987, 62-324138; Dec. 23, 1987, 62-324139

Int. Cl.[5] G11B *7/12*

U.S. Cl. 369—44.14 **12 Claims**



1. An optical head assembly for use with an optical disk apparatus for focusing a light beam issuing in a track traversing direction which is substantially parallel to a radial direction of an optical disk onto a recording medium surface of said optical disk from a focusing direction which is substantially perpendicular to said recording medium surface, and guiding a reflection from said recording medium surface along a same path as but

in the opposite direction to the light beam to record and/or reproduce information out of said optical disk, said assembly comprising:

magnetic circuit means comprising permanent magnets each being elongate in the track traversing direction and a yoke for forming a magnetic circuit which conducts a magnetic field generated by said permanent magnets, said yoke being provided with a first through hole extending throughout said yoke in the focusing direction, magnetic gaps located at opposite sides of said first through hole in the track traversing direction and each accommodating respective one of said permanent magnets, and a second through hole for admitting the light beam issuing in the track traversing direction to guide the light beam to said first through hole, said first through hole and said magnetic gaps each having a cross-section which is relatively long in the track traversing direction;

beam deflecting means loosely fitted in said first through hole for deflecting in the focusing direction the light beam which is incident to said beam deflecting means via said second through hole;

a carriage supporting said beam deflecting means;

an objective lens for focusing the light beam deflected by said beam deflecting means in the focusing direction onto said recording medium surface;

a lens holder holding said objective lens and mounted on said carriage movably in the focusing direction;

guide members supporting said magnetic circuit means and said carriage movably in the track traversing direction along said recording medium surface;

a focusing coil wound around said lens holder and partly contained in said magnetic gaps for, when a current is fed through said focusing coil, transporting said lens holder in the focusing direction in cooperation with the magnetic field which is developed by said permanent magnets;

tracking coils wound around said lens holder and partly contained in said magnetic gaps for, when a current is fed through said tracking coils, transporting said lens holder in the track traversing direction in cooperation with the magnetic field which is developed by said permanent magnets; and

drive means connected to said magnetic circuit means for transporting said magnetic circuit means in the track traversing direction along said recording medium surface with said magnetic circuit means being guided by said guide means.

4,958,336

OPTICAL HEAD DEVICE

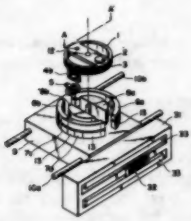
Yasuo Suzuki, Tokyo, and Toru Tatsuno, Fuchu, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 922,855, Oct. 24, 1986, abandoned. This application Mar. 13, 1989, Ser. No. 323,224

Claims priority, application Japan, Nov. 8, 1985, 60-249016

Int. Cl.[5] G11B *7/08*

U.S. Cl. 369—44.21 **4 Claims**



1. An optical head comprising:

a light source for emitting a light beam;

an optical member for guiding the light beam emitted from said light source to an object to be irradiated, said optical member having an optical axis;

a single member optical head body in which said optical member is installed;

a support shaft directly secured to said optical head body by being pressed therein, said support shaft being secured substantially free from inclination with respect to the optical axis of said optical member;

an objective holding member movably supported by said support shaft;

an objective for condensing the light beam passing through said optical member onto the object, said objective being held by said objective holding member;

drive means for moving said objective relative to said optical head body; and

a motor for moving said optical head body.

4,958,337

DISK RECORDING CHECKING METHOD FOR DETERMINING IF A DISK IS DEFECTIVE BY THE NUMBER OF ERRORS PRESENT

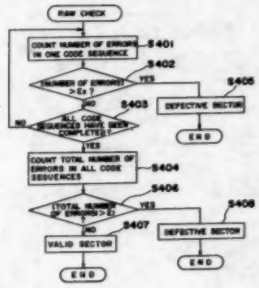
Toshihiro Yamanaka, Ikoma; Nobuyuki Horie, Yamatokoriyama; Shozou Kobayashi; Toshihisa Deguchi, both of Nara; Takeshi Yamaguchi, Tenri; Shigemi Maeda, Yamatokoriyama; Yoshiki Nishioka, Tenri, and Teruki Sugiura, Yamatokoriyama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 16,932, Feb. 20, 1987, abandoned. This application Apr. 28, 1989, Ser. No. 344,530

Claims priority, application Japan, Feb. 20, 1986, 61-36067; Feb. 26, 1986, 61-40801; Feb. 26, 1986, 61-40803

Int. Cl.[5] G11B *19/00*

U.S. Cl. 369—58 **7 Claims**



1. A disk recording error checking method, comprising the steps of:

(a) establishing a predetermined number of acceptable errors;

(b) writing data onto a disk in a form of sectors, each sector being formed of code sequences, each code sequence including a data portion and a parity portion;

(c) reading a complete sector of data from the disk immediately after completing said step (b);

(d) counting a number of errors in one individual code sequence of the read sector;

(e) determining if the number of errors counted in said step (d) is greater than the predetermined number of acceptable errors established in said step (a);

(f) determining if all of the code sequences of the read sector have been processed by said steps and (d) and (e) only when said step (e) has determined that the number of errors counted in said step (d) is not greater than the predetermined number of acceptable errors;

(g) repeating said steps (d), (e), and (f) only when said step (f)

has determined that all of the code sequences of the read sector have not been processed;

(h) indicating that the read sector of said step (c) is valid only when said step (f) has determined that all of the code sequences of the read sector have been processed; and

(i) setting the predetermined number of accepted errors to a value less than a number of correctable errors in each individual code sequence.

4,958,338

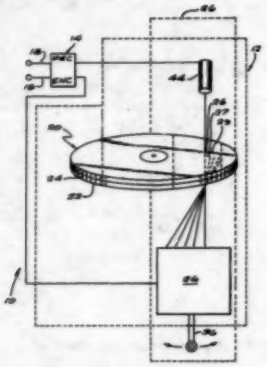
HIERARCHICALLY MULTIPLEXED OPTICAL RECORDING SYSTEM FOR STORAGE OF DIGITAL DATA

William P. Miller, 581 Alta Vista Dr., Sierra Madre, Calif. 91024

Continuation-in-part of Ser. No. 936,237, Dec. 1, 1986, abandoned. This application Sep. 1, 1988, Ser. No. 239,617

Int. Cl.[5] G11B *7/125*

U.S. Cl. 369—59 **7 Claims**



1. A data storage system for converting a series of discrete units of incoming signal data into a single unit of stored information at a specific location of a data storing medium comprising:

means for producing energy having a plurality of independently variable properties susceptible to recordation;

means responsive to the units of incoming signal data for quantizing at least some of the variable properties at at least one of a plurality of quantization levels and in accordance with a hierarchical order between the properties and between the levels of each such property so that each recordable data value of the incoming signal corresponds to a respective unique combination of quantized properties; and

means for recording the combination of quantized properties in a superimposed manner at the same storage location on the data-storing media.

4,958,339

OPTICAL CARD WITH INCREASED DATA STORAGE CAPACITY AND RECORDING/REPRODUCING APPARATUS THEREFOR

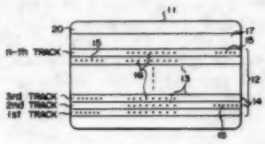
Ikuo Koyama, Tokyo, and Hajime Ohata, Yamato, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 3, 1989, Ser. No. 293,048

Claims priority, application Japan, Jan. 7, 1988, 63-738; Jan. 13, 1988, 63-5120

Int. Cl.[5] G11B *3/74, 7/20*

U.S. Cl. 369—98 **12 Claims**



1. An optical card for storing data, comprising:

a base member;

a plurality of parallel linear tracks on the base member for storing the data; and

address means alternately disposed on an opposite end of each successive track for storing an identifying code corresponding to the respective track.

4,958,341

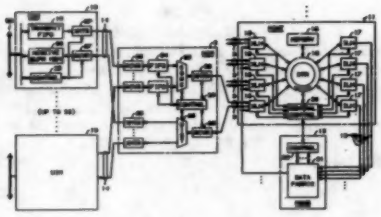
INTEGRATED PACKETIZED VOICE AND DATA SWITICHING SYSTEM

Jayant G. Hemmady; William P. Lidinsky; Scott B. Steele, all of Naperville; Werner Ulrich, Glen Ellyn, and Ronald C. Weddige, Western Springs, all of Ill., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Mar. 31, 1988, Ser. No. 175,547

Int. Cl.[5] H04Q *11/04*

U.S. Cl. 370—60.1 **9 Claims**



1. A system for switching voice signals comprising:

means for converting said voice signals into voice packets; and

means, connected to said means for converting, for packet switching said voice packets, comprising:

a plurality of input packet handlers and a plurality of output packet handlers;

memory access means for controlling storing and reading of said voice packets, comprising a plurality of memory access controllers for storing consecutive words of a voice packet in consecutive members of a plurality of memory modules; and

means for distributing said voice packets from said plurality of input packet handlers to said plurality of memory ac-

cess controllers, for chaining packets to be transmitted to a common group of destinations, and for distributing said chained voice packets form said plurality of memory access controllers to said plurality of output packet handlers.

4,958,342

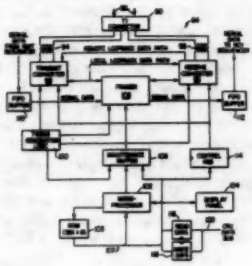
ADAPTIVE DIGITAL NETWORK INTERFACE

Stephen J. Williams, Denver, Colo., and Elden D. Traster, Richardson, Tex., assignors to Aristacom International, Inc., San Francisco, Calif.

Continuation of Ser. No. 234,262, Aug. 19, 1988, Pat. No. 4,935,925, which is a continuation of Ser. No. 24,345, Mar. 11, 1987, Pat. No. 4,882,727. This application Nov. 9, 1989, Ser. No. 435,276

Int. Cl.[5] H04J *3/06*

U.S. Cl. 370—79 **26 Claims**



1. A method of serially transmitting data bits over a plurality of time-multiplexed channels on a digital telecommunication circuit, comprising the steps of:

determining one or more time intervals associated with a first channel and one or more time intervals associated with a second channel;

transmitting data bits associated with said first channel during one or more of said time intervals associated with said first channel;

generating a non-data bit in response and subsequent to a predetermined pattern of transmitted data bits;

transmitting said non-data bit prior to transmitting a next data bit; and

transmitting data associated with said second channel after transmitting a predetermined number of data and non-data bits associated with said first channel.

4,958,343

COMMUNICATION CHANNEL RESERVATION

Gabriela M. Abramovici, Naperville; Rolfe E. Buhrke, Westchester; Bopsi Chandramouli, Aurora; Robert B. Dianda, Wheaton; Leo R. Katzenstein, Naperville; Thomas M. O'Connor, Naperville; Timothy G. Rinker, Naperville, and Susan J. Tripp, Warrenville, all of Ill., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Nov. 30, 1988, Ser. No. 278,067

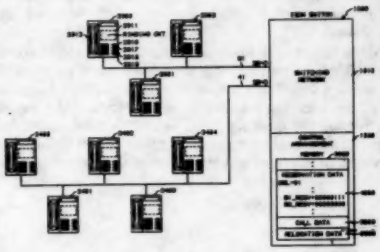
Int. Cl.[5] H04L *5/22*

U.S. Cl. 370—85.1 **55 Claims**

1. A method for a switching system connectable to a plurality of terminals by a single line comprising a plurality of communication channels, said method comprising

receiving an incoming call and

in response to said incoming call, reserving one of said plurality of channels, said reserving being for a multiple number of said terminals and for use in answering and



originating calls by only one of said multiple number of said terminals under control of said reserving.

4,958,344

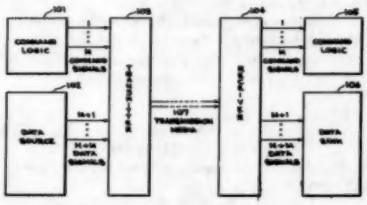
SYSTEM FOR TRANSMITTING AND RECEIVING ASYNCHRONOUS NONHOMOGENEOUS VARIABLE WIDTH PARALLEL DATA OVER A SYNCHRONOUS HIGH SPEED SERIAL TRANSMISSION MEDIA

Paul H. Scott, San Jose, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Continuation of Ser. No. 250,977, Sep. 23, 1988, abandoned, which is a continuation of Ser. No. 810,946, Dec. 18, 1985, abandoned. This application May 23, 1989, Ser. No. 355,890

Int. Cl.[5] H04J *3/04, 3/22*

U.S. Cl. 370—112 **171 Claims**



1. A system which utilizes a synchronous serial transmission media to transmit data between a data source that generates asynchronous nonhomogeneous variable width parallel data pattern inputs, and a data sink that accepts parallel data pattern outputs corresponding to said inputs, comprising:

(a) transmitter means responsive to each of said parallel data pattern inputs, for synchronously transmitting a serial data pattern representative of a given input over said media; and

(b) receiver means, responsive to data transmitted over said media, for generating said parallel data pattern outputs.

4,958,345

MEMORY TESTING DEVICE

Kenichi Fujisaki, Gyoda, Japan, assignor to Advantest Corporation, Tokyo, Japan

Filed Dec. 21, 1988, Ser. No. 287,139

Claims priority, application Japan, Dec. 29, 1987, 62-335812

Int. Cl.[5] G06F *11/00*

U.S. Cl. 371—21.3 **15 Claims**

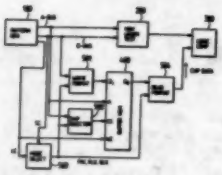
1. A memory testing device for testing a memory capable of effecting a write operation and a read operation in a pixel mode, a plane mode and a block mode, comprising:

pattern generating means for generating an address and data for supply to the memory under test;

buffer memory means which, letting the number of bits to be written in and read out of each address of the memory under test be represented by W, has W^2 individual memory chips which define a matrix with W rows and W columns;

mode select means for generating a mode select signal for selecting and specifying the same mode as used in the memory under test for each of write and read operations;

chip select means, responsive to the mode select signal, for selecting the memory chips so that data generated by said pattern generating means is written in said buffer memory means in the same mode as used in the memory under test



and so that data stored in said buffer memory means is read out in the same mode as used in the memory under test;

write format means responsive to the mode select signal from said mode select means, for writing the same data as in the memory under test into said buffer memory means in the same mode as in the memory under test;

read format means responsive to the mode select signal, for reading said buffer memory means in the same mode as in the memory under test; and

logical comparison means which receives, as expected value data, the data output from said read format means, for comparing the data output from said read format means with data read out of the memory under test.

4,958,346

MEMORY TESTING DEVICE

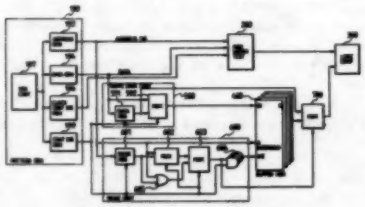
Kenichi Fujisaki, Gyoda, Japan, assignor to Advantest Corporation, Tokyo, Japan

Filed Dec. 30, 1988, Ser. No. 292,100

Claims priority, application Japan, Jan. 11, 1988, 63-4181

Int. Cl.[5] G06F *11/00*

U.S. Cl. 371—21.3 **1 Claim**



1. A memory testing device for testing a memory under test having a flash write mode, comprising:

a pattern generator for generating an address and data, including flash write data and mask data, for input into the memory under test which produces read out data, said pattern generator also generating control signals;

a buffer memory coupled to said pattern generator and having a data input terminal and at least the same storage capacity as the memory under test, said buffer memory being accessed by the address from said pattern generator;

a data register, coupled to said pattern generator, for storing, in response to one of the control signals generated by said pattern generator, the flash write data generated by said pattern generator;

a first multiplexer, coupled to said buffer memory, said pattern generator and said data register for selecting, in response to one of the control signals from said pattern generator, one of the flash write data stored in said data register and the data generated by said pattern generator, and for providing the selected data to the data input terminal of said buffer memory;

a logical comparator, coupled to the memory under test and said buffer memory, for receiving, as an expected value, data read out of said buffer memory, and for making a logical comparison between the data read out of said buffer memory and the read out data from the memory under test;

a mask controller including a mask data register, coupled to said pattern generator, for storing, in response to one of the control signals from said pattern generator, the mask data which is input to the memory under test by said pattern generator, and mask control means for prohibiting writing of the output data from said first multiplexer into said buffer memory for bits corresponding to the mask data stored in said mask data register; and

a second multiplexer, coupled to said data register, said buffer memory, and said logical comparator, for selectively providing bits corresponding to one of the flash write data stored in said data register and the read-out data from said buffer memory in accordance with logical states of the corresponding bits of the mask data from said mask controller, the output data from said second multiplexer being provided as the expected value to said logical comparator;

said pattern generator including control signal generating means, coupled to said mask control means, for generating, as one of the control signals, a read/write control signal and providing it to said buffer memory via said mask control means for effecting read/write control of said buffer memory, so that, during each test cycle the readout of the row address area of the memory under test into which the flash write data has been written, the output expected value of said second multiplexer and the data read out of the memory under test are subjected to logical comparison by said logical comparator in a first half of each test cycle, and the data written in he data register while inhibiting the write of data in said buffer memory at each bit specified by the mask data from said mask controller is written into said buffer memory in a second half of each test cycle.

4,958,347

APPARATUS, METHOD AND DATA STRUCTURE FOR VALIDATION OF KERNEL DATA BUS

Bruce T. White, Woodinville; John D. Polstra, Seattle, and Craig V. Johnson, Everett, all of Wash., assignors to John Fluke Mfg. Co., Inc., Everett, Wash.

Filed Nov. 23, 1988, Ser. No. 275,185

Int. Cl.[5] G01R *31/28*

U.S. Cl. 371—29.5 **10 Claims**

1. A method for validation of the data bus of a micro-processor based unit under test (UUT) comprising the steps of

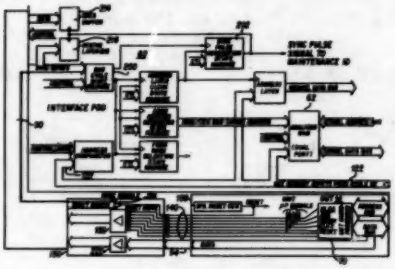
(a.) performing a load operation of a first bit pattern containing a number of bits equal to one-half the number of lines in at least a portion of said data bus over a first plurality of lines in said data bus,

(b.) performing a load operation of a second bit pattern which is the complement of said first bit pattern over a second plurality of bus lines of said data bus lines,

(c.) comparing said first and second bit patterns to determine whether said second bit pattern is the complement of said

second bit pattern to determine if said second bit pattern is not the complement of said first bit pattern,

(d.) performing a load operation of a third bit pattern containing a number of bits equal to one-half the number of lines in at least a portion of said data bus over a third plurality of lines in said data bus,



(e.) performing a load operation of a fourth bit pattern which is not the complement of said third bit pattern over a fourth plurality of bus lines of said data bus lines,

(f.) comparing said third and fourth bit patterns to determine if said fourth bit pattern is not the complement of said third bit pattern, and

(g.) validating said data bus based upon the results of steps (c.) and (f.).

4,958,348

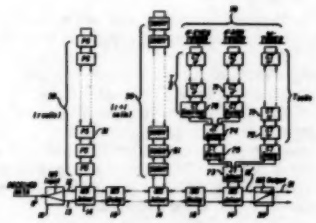
HYPERSYSTOLIC REED-SOLOMON DECODER

Elwyn R. Berlekamp, Berkeley; Gadiel Seroussi, Cupertino, and Po Tong, Alameda, all of Calif., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 155,244, Feb. 12, 1988, abandoned. This application Nov. 21, 1988, Ser. No. 274,120

Int. Cl.[5] G06F *11/10*

U.S. Cl. 371—37.1 **4 Claims**



1. A hypersystolic apparatus for operating upon a serialized Reed-Solomon encoded information stream, said stream possibly corrupted by errors and comprising sequential symbol blocks each of length N symbols and redundancy r for correcting as many as T=errata encountered in each said symbol block of said information stream, comprising

(a) data stream splitter for producing a copy of said information stream whereby first and second information streams are initially identical for separate processing and said information streams are initially synchronized, each said information stream comprising consecutive blocks of said N symbols, each said symbol comprising m bits,

(b) dual channel digital delay line means for propagating each of said first and second information streams along respective channels to error corrector means, said channel supporting said second information stream further comprising a plurality of joiner means for diverting said second information stream onto respective propagation paths comprising first, second and third folded hypersystolic arrays and returning said second information stream from said lateral propagation paths to said respective channel of said digital delay line, whereby said second information stream is processed in each of said hypersystolic arrays to produce a stream of error corrector information,

(c) said first hypersystolic array defining a first lateral folded data path for processing said second information stream to evolve same to a stream of r power sum symmetric functions S of each said Reed-Solomon symbol block,

(d) said second hypersystolic array defining said second lateral path for receiving said serialized power sum symmetric functions and determining solutions of the key equation therefor, to obtain serialized polynomials $\omega(z)$ and $\sigma(z)$ of minimum degree satisfying

$$(1+S(z))\sigma(z)=\omega(z) \bmod z^r$$

where said $\sigma(z)$ comprise coefficients of the error location polynomial, said $\omega(z)$ comprise the error valuator polynomial, said second data stream modified by said second hypersystolic array to comprise T+1 coefficients of said polynomial σ and T coefficients of said polynomial ω,

(e) said third hypersystolic array being for receiving said polynomial coefficients σ and ω and producing therefrom a serialized stream of correction information for return to said second channel of said dual channel digital delay line, said correction information stream being synchronized with said first information stream,

(f) corrector means for linearly combining each datum of said first information stream with the respective datum of said correction stream to produce a corrected data stream.

4,958,349

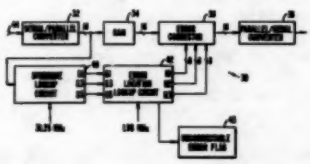
HIGH DATA RATE BCH DECODER

Robert M. Tanner, Capitola; Richard Koralek; Frank Chethik, both of Palo Alto; Stephen B. Lengel, Cupertino, and David H. Miller, Sacramento, all of Calif., assignors to Ford Aerospace Corporation, Newport Beach, Calif.

Filed Nov. 1, 1988, Ser. No. 265,625

Int. Cl.[5] G06F *11/10*

U.S. Cl. 371—37.1 **22 Claims**



1. An apparatus for decoding in linear error correcting code, said decoding being at data speeds greater than direct computation capabilities of error computation circuitry, said apparatus comprising:

first register means for temporarily storing a complete representation of an input code word;

means for determining at least one syndrome to identify errors in said input code word;

means coupled to said syndrome determining means for identifying from said at least one syndrome a corresponding error location in said input code word by table lock-up to maximize processing speed, said error location identifying means including a first memory means storing a cyclic invariant representation of error patterns for each syndrome to minimize the size of said memory means for use by table lock-up; and

means coupled to said error location identifying means and

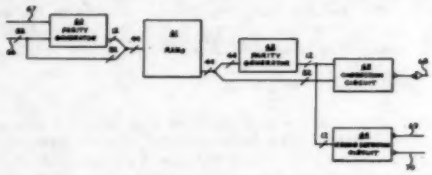
to said first register means for correcting said input code word from said at least one syndrome.

4,958,350

ERROR DETECTING/CORRECTION CODE AND APPARATUS

Wm. Spencer Worley, III, San Jose; Eltan Fenson, Los Altos, and James R. Weatherford, San Jose, all of Calif., assignors to Stardent Computer, Inc., Sunnyvale, Calif.

Filed Mar. 2, 1988, Ser. No. 163,616
Int. Cl.[5] G06F *11/10*
U.S. Cl. 371—37.4 33 Claims



24. An improved method for detecting and correcting errors in binary coded information, said method detecting and correcting all single bit errors in an information word, said method further detecting all two-bit errors and detecting inversion of any number of bits received from a single circuit, said method comprising the steps of:

receiving a plurality of binary codes comprising an information word;

grouping said plurality of binary codes;

generating a parity code for each of said groups of binary codes;

said plurality of binary codes being grouped such that for any three of said parity codes there is either a single of said binary codes or none of said binary codes which affects each of said three parity codes;

said plurality of binary codes further being grouped such that for any four of said parity codes none of said binary codes affects each of said four parity codes;

said plurality of binary codes further being grouped such that any single of said binary codes affects the value of three of said parity codes;

said plurality of binary codes being stored in a first plurality of circuits and said parity codes being stored in at least one second circuit;

said plurality of binary codes further being grouped on said circuits such that any single of said binary codes affects no more than three of said parity code elements;

receiving said plurality of binary codes and said parity codes from said first plurality of circuits and said at least one second circuit;

generating syndrome codes based on said plurality of binary codes and said parity codes wherein one of said syndrome codes is generated for each group of binary codes; said syndrome codes representative of a parity value for said group of binary codes and a parity code;

grouping said syndrome codes into a plurality of groups;

determining whether:

(a) a single of said syndrome codes in each of said groups of syndrome codes is in a first predetermined state;

(b) a single of a first of said groups of syndrome codes is in a first predetermined state and each of the remaining of said syndrome codes is in a second predetermined state;

either condition (a) or condition (b) indicating a correctable error has occurred;

determining whether:

(c) a non-correctable error has occurred by examining whether one or more of said syndrome codes is in said first predetermined state and whether

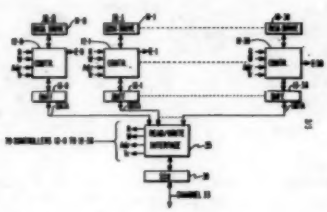
a correctable error has occurred.

4,958,351

HIGH CAPACITY MULTIPLE-DISK STORAGE METHOD AND APPARATUS HAVING UNUSUALLY HIGH FAULT TOLERANCE LEVEL AND HIGH BANDPASS

Laurence P. Flora, Covina, and Gary V. Ruby, Pasadena, both of Calif., assignors to Unisys Corp. (Formerly Burroughs Corp.), Detroit, Mich.

Continuation-in-part of Ser. No. 825,495, Feb. 3, 1986, abandoned, which is a continuation-in-part of Ser. No. 825,174, Feb. 3, 1986, Pat. No. 4,722,085. This application Apr. 1, 1988, Ser. No. 176,480
Int. Cl.[5] G06F *11/10*
U.S. Cl. 371—40.1 28 Claims



1. A method for accessing a large quantity of digital data in a manner so as to achieve a high fault tolerance level as well as a high bandpass, said method comprising:

providing a set of separably operable disk drive means each including at least one rotatable disk and cooperating head means;

receiving data to be written on said disk drive means as data digits;

generating error check digits is response to said data digits;

writing data on said set of separably operable disk drive means in the form of data words each comprised of data digits and at least one associated error check digit chosen so as to permit an error in a data word to be determinable, said data words being stored in said set of disk drive means such that each disk drive means stores at least one digit of each data word;

reading data from said set of disk drive means as a plurality of data words;

error detecting and correcting data words read from said set of disk drive means using the associated error check digits; and

producing electrical signals corresponding to the data digits of a data word after said error correcting;

said method including providing caching of data stored on said set of disk means using a cache memory constructed and arranged to operate in a manner such that data words are stored in said cache memory and accessed therefrom in correspondence with the manner in which data words are stored on said set of disk means.

4,958,352

SEMICONDUCTOR MEMORY DEVICE WITH ERROR CHECK AND CORRECTING FUNCTION

Kenji Noguchi; Tsuyoshi Toyama; Shinichi Kobayashi; Nobuaki Andoh, and Kenji Kohda, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 4, 1988, Ser. No. 253,001
Claims priority, application Japan, Oct. 5, 1987, 62-251930
Int. Cl.[5] G06F *11/10*
U.S. Cl. 371—40.1 15 Claims

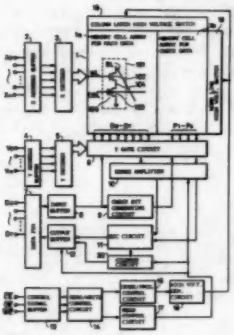
1. A semiconductor memory device having a function for checking and correcting bit errors, comprising:

storing means for storing information of a plurality of bits,

error check and correcting means for checking and correcting bit errors of the information stored in said storing means,

said error check and correcting means generating a predetermined count signal every time it corrects a bit error,

counting means for counting said predetermined count signal generated from said error check and correcting means and



output means for selectively outputting the information read out from said storing means and the number counted by said counting means.

4,958,353

DEVICE FOR CALCULATING THE PARITY BITS OF A SUM OF TWO NUMBERS

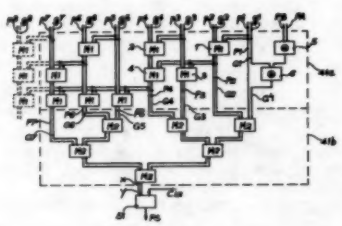
Alain Greiner, Paris; Xiaowei Sun, Pantin, and Michel Thill, Les Clayes-Sous-Bois, all of France, assignors to Bull S.A., Paris, France

Filed Feb. 17, 1989, Ser. No. 311,736

Claims priority, application France, Feb. 18, 1988, 88 01910

Int. Cl.[5] G06F *11/10*

U.S. Cl. 371—49.4 **21 Claims**



1. A system for calculating the parity bit (PC associated with at least one group of m consecutive bits extracted from the carry word (C) appearing at the time of the addition of two binary numbers (A, B), said numbers each including at least one group of m bits, the groups belonging respectively to said numbers (A, B) and to the carry word (C) comprising respective bits of the same significance, said groups extracted from said numbers (A, B) being formed respectively by bits $a_m, \ldots, a_i, \ldots, a_2, a_1$ and bits $b_m, \ldots, b_i, \ldots, b_2, b_1$, where the subscript i indicates the significance in the group of the associated bit (a_i, b_i), said system being characterized in that it comprises:

first means (11) for calculating, for every i included between 1 and m−1, the values:

$$P_i = a_i \oplus b_i$$

$$\text{pi } g_i = a_i \cdot b_i$$

where ⊕ indicates the EXCLUSIVE OR operation.

first operator means (41*a*) for calculating, for every i included between 1 and m−1, the values P_i and the values G_i verifying the following recurring logical equations:

$$P_i = p_i p_{i-1}, \text{ with } P_1 = p_1$$

$$G_i = g_i + p_i G_{i-1}, \text{ with } G_1 = g_1$$

second operator means (41*b*) for calculating the values Y and X, where

$$Y = G_1 \oplus G_2 \oplus \ldots \oplus G_i \oplus \ldots \oplus G_{m-1}$$

$$X = P_1 \oplus P_2 \oplus \ldots \oplus P_i \oplus \ldots \oplus P_{m-1}$$

and third operator means (51) for calculating the value PC where

$$PC = Y \oplus c_{in} X^*$$

where c_{in} is the least significant carry bit of the group, and where X^* is the complement of X.

4,958,354

APPARATUS FOR STABILIZING THE INTENSITY OF LIGHT

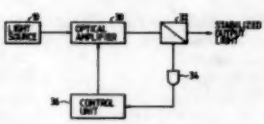
Tsuneyuki Urakami; Shinichiro Aoshima, and Yutaka Tsuchiya, all of Shizuoka, Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan

Filed May 8, 1989, Ser. No. 348,450

Claims priority, application Japan, May 26, 1988, 63-129194

Int. Cl.[5] H01S *3/13*

U.S. Cl. 372—29 **5 Claims**



1. An apparatus for stabilizing intensity of light emitted from a light source to produce substantially constant-intensity light, comprising:

an optical amplifier, having a gain which is adjustable by a controlling electrical signal, for amplifying incident light emitted from said light source;

beam splitting means for branching said amplified incident light emitted from said light source into stabilized output light and feedback light;

light intensity detecting means for converting said feedback light into an electrical signal; and

control means for producing said control electrical signal in accordance with said electrical signal converted from said feedback light.

4,958,355

HIGH PERFORMANCE ANGLED STRIPE SUPERLUMINESCENT DIODE

Gerard A. Alphonse, Princeton, and Stephen L. Palfrey, Metuchen, both of N.J., assignors to RCA Inc., Vaudreuil, Canada

Filed Mar. 29, 1989, Ser. No. 330,033

Int. Cl.[5] H01S *3/19*

U.S. Cl. 372—45 **14 Claims**

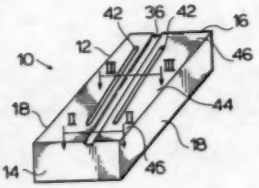
1. A super luminescent light emitting device comprising:

a semiconductor body having spaced first and second op-

posed end faces with an active region extending therebetween, the body including a central region and two opposing end regions extending a predetermined distance from the end faces to the central region;

gain guiding means comprising a linear strip of material adjacent to a side of the active region extending between the end faces and inclined along its longitudinal axis at a predetermined angle relative to a direction normal to at least one of the end faces;

an optical beam path extending between the end faces at the active region parallel to the longitudinal axis of the gain



guiding means, the optical beam path having end lateral boundaries at each of the end regions whose lateral carrier and optical confinement is determined by the gain guiding means to allow light reflected at the end faces to be refracted out of the optical beam path; and,

index guiding means extending over the central region on opposite sides of the gain guiding means parallel to the longitudinal axis of the gain guiding means, the index guiding means determining central lateral boundaries for the optical beam path to provide lateral carrier and optical confinement for the optical beam path in the central region.

4,958,356

EXCIMER LASER APPARATUS

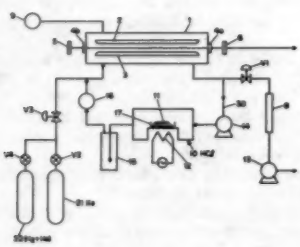
Ryohei Tanuma, Kanawa, Japan, assignor to Fuji Electric Co., Ltd., Kawasaki, Japan

Filed Oct. 4, 1989, Ser. No. 416,964

Claims priority, application Japan, Oct. 4, 1988, 63-250152

Int. Cl.[5] H01S *3/22*

U.S. Cl. 372—59 **8 Claims**



1. A rare gas halide excimer laser comprising

(a) a chamber defining a laser cavity;

(b) means for supplying the rare gas and hydrogen gas to the cavity;

(c) a gas recirculation loop defining a flow path extending from and contiguous with a first end of the laser cavity to a second end of the laser cavity;

(d) gas flow control means effective to cause gas to flow out of the laser cavity through the flow path defined by the recirculation loop and back into the laser cavity; and

(e) a hydrogen chloride generator disposed within the recirculation loop such that gas flow through the loop passes through the hydrogen chloride generator, said hydrogen chloride generator comprising means for producing hydrogen chloride gas from hydrogen gas present in the gas flow and a reactant in the chamber.

4,958,357

GRATING-COUPLED SURFACE EMITTING LASER AND METHOD FOR THE MODULATION THEREOF

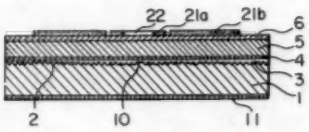
Junichi Kinoshita, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 19, 1988, Ser. No. 286,027

Claims priority, application Japan, Dec. 19, 1987, 62-321707; Apr. 11, 1988, 63-88697; Jun. 10, 1988, 63-141622

Int. Cl.[5] H01S *3/10*

U.S. Cl. 372—96 **7 Claims**



1. A grating-coupled surface emitting laser, comprising:

a crystalline active layer structure including

a wave-guiding layer, and

a second or higher-order grating extending along a laser cavity of said crystalline active structure, said laser cavity being defined as a length along which light propagation is permitted;

two electrodes, sandwiching said crystalline active layer structure, for exciting said crystalline active layer structure;

at least one window, on either of said electrodes, for obtaining an output beam from a surface of said crystalline active layer structure as radiation modes which are produced by two counter-running guided light waves; and

phase-shifting means for providing an effect of shifting a phase of said grating to cause said radiation modes to interfere constructively in a region of said crystalline active structure corresponding to said window.

4,958,358

APPARATUS FOR THE THERMAL TREATMENT OF A METALLIC MELT

Schunk Eckart, Düsseldorf, Fed. Rep. of Germany, assignor to Mannesmann Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany

Filed May 17, 1989, Ser. No. 352,934

Claims priority, application Fed. Rep. of Germany, May 18, 1988, 3817379

Int. Cl.[5] H05B *7/00*

U.S. Cl. 373—72 **20 Claims**

1. An apparatus for the thermal treatment of a metallic melt comprising:

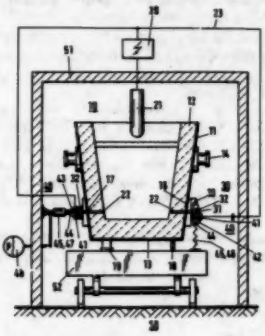
a metallurgical vessel (10) for receiving said melt, said vessel having an outer jacket(11);

D.C. arc heating means for heating said melt comprising at least one electrode (21) positioned above said melt and at least one counterelectrode (22) in contact with said melt;

first means (30) on said outer jacket and connected to said counterelectrode for transferring electrical energy to said counterelectrode, said transfer means comprising a first contact plane (31);

second means (40) for directly transferring electrical energy to said first transfer means (30), said second transfer means (40) comprising a support element (43) and detachably mounted thereto a structural part (44) having a second contact plane (41); and means (45,44) operatively con-

nected to said second transfer means for mechanically positioning said contact plane of said second transfer



means in electrical energy conducting relation with said contact plane of said first transfer means.

4,958,359

COMMUNICATION APPARATUS

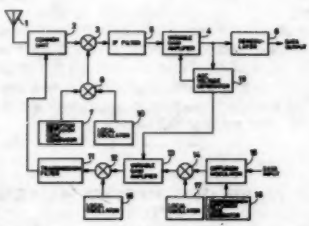
Ichiro Kato, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 7, 1988, Ser. No. 203,084

Claims priority, application Japan, Jun. 9, 1987, 62-142155

Int. Cl.[5] H04K 1/02

U.S. Cl. 375—1 **15 Claims**



9. A spectrum diffusion communication apparatus comprising:

receiving means for receiving a signal;

first conversion means for converting the signal received by said receiving means in accordance with a first diffusion code, said first diffusion code being determined on the basis of a diffusion code used in transmission by a partner station;

control signal generating means for generating a control signal corresponding to an output level of said first conversion means;

second conversion means for converting the signal received by said receiving means in accordance with a second diffusion code, said second diffusion code being determined on the basis of another diffusion code used in transmission by the partner station;

demodulation means for demodulating source data from the output of said second conversion means;

third conversion means for correlating data to be transmitted to a third diffusion code;

transmission means for transmitting the output of said third conversion means to the partner station; and

transmission control means for controlling a transmission level of said transmission means in accordance with the control signal generated by said control signal generating means.

4,958,360

CIRCUIT FOR RECOVERING THE CARRIER IN DIGITAL TRANSMISSION SYSTEMS

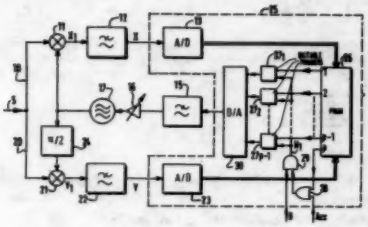
Hikmet Sari, Creteil, France, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 249,614, Sep. 26, 1988, abandoned. This application Oct. 11, 1989, Ser. No. 420,681

Claims priority, application France, Sep. 25, 1987, 87 13292

Int. Cl.[5] H04L 27/06

U.S. Cl. 375—97 **20 Claims**



1. A circuit for recovering a carrier from a digitally modulated wave having a phase symmetry $2\lambda/M$, where M is an integer representing a symmetry order of a modulation scheme of said digitally modulated signal, said modulation scheme corresponding to a signal constellation having states, which states are representable using a grapic representation in polar coordinates by a function $F(A, \Phi)$, where A and Φ represent modulus and phase, respectively, of the states in the signal constellation, the circuit comprising:

(a) a voltage-controlled oscillator having an output for supplying an output signal which represents said carrier and a control input for receiving an error signal $\epsilon(\phi)$ for changing a phase of the oscillator to adjust it to a phase of said digitally modulated wave, the phase ϕ being the phase difference between signal points of received digitally modulated wave and corresponding states, idealized ones of said signal points being states of said signal constellation;

(b) a first channel for in-phase demodulation;

(c) a second channel for quadrature-phase demodulation;

(d) phase comparing means, coupled to outputs of the first and second channels and to receive a basic recovered clock signal H, for determining and validating a comparator signal, the phase comparing means alternatively operating as phase detector and as a frequency detector and comprising means for selecting received signal points using selection zones, said selection zones being defined with respect to said graphic representation as located around certain states of the signal constellation, said selection zones appearing in said graphic representation as ring segments;

(e) means for producing a variable rate sampling clock signal which reproduces the basic clock signal H by discarding certain edges, said producing means:

(i) when the circuit is in acquisition mode (unlocked), validating the basic clock signal H only for the selection zones; and

(ii) when the circuit is in permanent mode (locked), validating all edges of the clock signal H for forming the sampling clock signal;

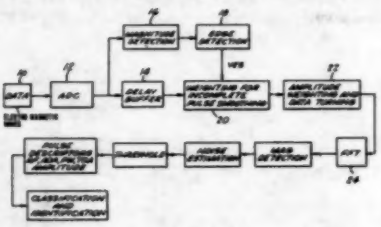
said sampling clock signal being supplied to the comparing means to control validating of the comparator signal; and

(f) means for converting the comparator signal to the error signal $\epsilon(\phi)$.

4,958,361
EDGE EFFECT REDUCTION BY SMOOTHING IN DIGITAL RECEIVERS

Robert A. Rosen, Santa Monica, and Kapriel A. Krikorian, Los Angeles, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Apr. 22, 1988, Ser. No. 185,018
Int. Cl.[5] H03K 5/01
U.S. Cl. 375—102 20 Claims

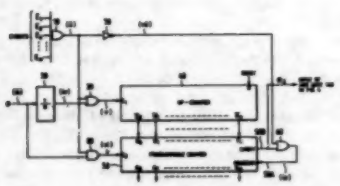


1. A method for reducing spectral splatter in a signal processor comprising:
processing digital data along two paths;
along the first of said two paths determining when said data comprises an edge; and
when said edge is determined in said first path, applying weights to said edge in said second path, said weights, when applied to said edge, tending to reduce said spectral splatter and tending to limit said edge to a narrow bandwidth when the weighted edge is spectrally analyzed.

4,958,362
CLOCK SIGNAL GENERATING CIRCUIT

Takashi Nishibe, and Shotaro Yokoyama, both of Kanagawa, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

Filed Oct. 27, 1988, Ser. No. 263,169
Claims priority, application Japan, Oct. 31, 1987, 62-277105
Int. Cl.[5] G04F 10/04
U.S. Cl. 377—20 4 Claims

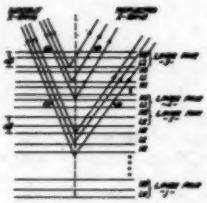


1. A circuit for generating clock signals, comprising:
means for generating firt clock signals;
means for frequency dividing said first clock signals by 1/N (N being an integer ≧1) to provide second clock signals;
first counting means for counting said second clock signals until a first event occurs;
second counting means for receiving both a count result as an initial value from said first counting means and said first clock signals, and for counting said first clock signals up to a predetermined count; said second counting means including means for outputting a third clock signal after counting to said predetermined count;
resetting means for resetting said second counting means back to said initial value after said second counting means counts to said predetermined value;
first gage means for outputting a first event signal to each of said first and second counting means when said first event occurs;
second gate means for supplying said second clock signals to said first counter means in response to said first event signal; and
third gate means for supplying said first clock signals to said second counter means in response to said first event signal.

4,958,363
APPARATUS FOR NARROW BANDWIDTH AND MULTIPLE ENERGY X-RAY IMAGING

Robert S. Nelson, 2922 Upshur St., San Diego, Calif. 92106; Zoran L. Barbaric, 3649 Surfwood, Malibu, Calif. 90265, and Reuven D. Zach, 27572 Santa Clarita Rd., Saugus, Calif. 91350

Continuation-in-part of Ser. No. 897,009, Aug. 15, 1986, abandoned. This application Aug. 12, 1988, Ser. No. 231,706
Int. Cl.[5] G21K 1/06
U.S. Cl. 378—85 19 Claims

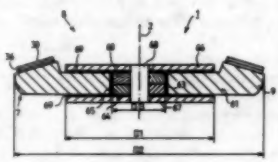


1. A multilayer x-ray reflector for multiple energy imaging consisting of:
a substrate;
a lower multilayer x-ray reflecting structure deposited on said substrate, said lower multilayer structure consisting of layer pairs of thickness d2, and an upper multilayer x-ray reflecting structure deposited on said lower x-ray reflecting structure, said upper multilayer structure consisting of layer pairs of thickness d1.

4,958,364
ROTATING ANODE OF COMPOSITE MATERIAL FOR X-RAY TUBES

Christine Guerin, Paris; Jean-Marie Penato, Les Essarts le Roi, and Yves Debrouwer, Charenton le Pont, all of France, assignors to General Electric CGR SA, Paris, France

Filed Dec. 22, 1988, Ser. No. 288,562
Claims priority, application France, Dec. 22, 1987, 87 17882
Int. Cl.[5] H01J 35/10
U.S. Cl. 378—144 7 Claims



1. A rotating anode for X-ray tube having an axis of rotation including a base body on which a target is formed by the deposit of at least one layer of target material wherein said base body includes a first disc shaped central section portion having the same axis as said axis of rotation and comprising at least a carbon-carbon composite material and wherein said base body

further includes a second portion of graphite supporting said target and arranged at least partly beyond the axial projection of said first central disc shaped portion with said first and second portions bound mechanically to one another by means of a brazing interconnection at the junction point of said first and second portions.

4,958,365

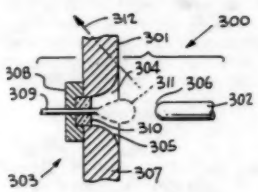
MEDICAL IMAGING DEVICE USING TRIGGERED PLASMA CATHODE FLASH X-RAY SOURCE

A. Robert Sohval, Cambridge, Mass.; Gerald Cooperstein, Rockville; Shyke A. Goldstein, Gaithersburg, both of Md., and David R. Hearn, Wellesley, Mass., assignors to Elscint Ltd., Haifa, Israel

Continuation of Ser. No. 153,487, Feb. 3, 1988, abandoned, which is a continuation of Ser. No. 896,324, Aug. 18, 1986, abandoned, which is a continuation of Ser. No. 611,088, May 17, 1984, abandoned, which is a division of Ser. No. 313,268, Oct. 21, 1981, Pat. No. 4,592,079. This application Jun. 5, 1989, Ser. No. 361,686

Int. Cl.[5] H01J *35/00*

U.S. Cl. 378—122 **7 Claims**



1. A triggered plasma cathode flash X-ray source comprising:

(a) a cathode containing a plurality of apertures for the passage of plasma;

(b) an array of rod-like anodes each having at least a part thereof facing one of said plurality of apertures;

(c) means for providing a potential difference between said cathode and said anodes which is less than the potential difference required to establish the flow of electrons between said cathode and said anodes;

(d) said cathode consisting of a planar conductive plate having one side thereof facing said anodes;

(e) a plurality of trigger systems each including a rod-like trigger electrode, electrically separated from the cathode, at least in part by a non-conducting surface,

(f) means for applying a trigger pulse to each of said trigger electrodes to produce a burst of plasma at said non-conducting surfaces;

(g) said trigger systems being on the other side of said cathode, and said aperture being, at least in part, between said trigger systems and said anodes;

(h) said trigger electrodes and said non-conducting surfaces being positioned to direct the plasma towards the anodes through the apertures such that said anodes transmit X-rays responsive to the impingement thereon of electrons from the cathode after the plasma has lowered the impedance between the anodes and the cathode sufficiently to establish electron flow therebetween, the longitudinal axes of the trigger electrodes being on imaginary lines normal to the plane of said cathode at the apertures and coaxial with said anodes;

(i) means for reducing spurious plasma flow between non-aligned trigger electrodes and anodes; and

(j) means for terminating electron flow between said anodes and said cathode.

4,958,366

TELEPHONE ANSWERING METHOD AND DEVICE PROVIDING OUTGOING MESSAGE IN A SELECTED LANGUAGE

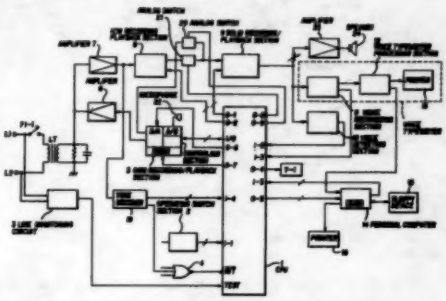
Kazuo Hashimoto, Tokyo, Japan, assignor to Hashimoto Corporation, Tokyo, Japan

Filed Aug. 22, 1988, Ser. No. 235,738

Claims priority, application Japan, Aug. 21, 1987, 62-207774

Int. Cl.[5] H04M *1/65*

U.S. Cl. 379—74 **3 Claims**



1. A telephone answering device adapted to be coupled to a telephone line and to a telephone and including means responsive to an incoming call for closing a loop on said, telephone line and for sending to a caller on the line an outgoing message (OGM) and means for storing said OGM in a native language, characterized in that said telephone answering device further includes language translating means for translating said OGM in said native language into, selectively, a plurality of different languages; means for receiving a control signal from said caller designating a desired one of said plurality of different languages and means responsive to said control signal for sending said OGM, translated into said desired one of said plurality of different languages, to said caller.

4,958,367

MULTICHANNEL COMMUNICATIONS RECORDER HAVING THE CAPABILITY TO DISPLAY CHANNEL ACTIVITY AND STATUS

Raymond F. Freer, 257 Lynnbrook Rd., Fairfield, Conn. 06432, and Willy M. Sander, 135 Sawmill Rd., Stamford, Conn. 06903

Filed Sep. 17, 1987, Ser. No. 97,909

Int. Cl.[5] H04M *1/65*

U.S. Cl. 379—84 **12 Claims**

1. A system for monitoring signals received on a plurality of channels, comprising:

(a) recording means for recording signals from each of said channels;

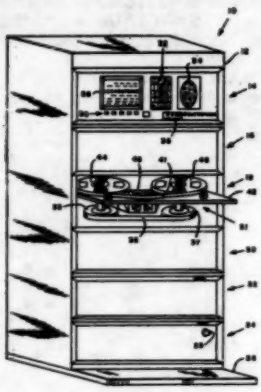
(b) control means for controlling the operation of said recording means;

(c) said recording means further comprising a plurality of record amplifiers, each of said record amplifiers amplifying one of said signals received on one of said channels, and each of said record amplifiers generating a channel active signal when the associated channel is active;

(d) addressable switch means for switching at least one of said channel active signals to said control means, said addressable switch means being responsive to said control means to select said at least one channel active signal; whereby the said control means monitors activity on selected channels; and,

(e) wherein said control means further comprises display

means for displaying, in a first display mode, the active or inactive state of each of said channels, said state being



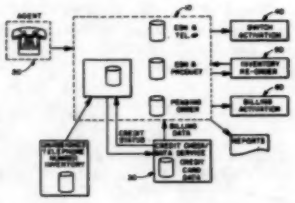
determined in accordance with the corresponding state of the associated channel active signal.

4,958,368

CUSTOMER ACTIVATION SYSTEM

Terry S. Parker, Spring, Tex., assignor to GTE Mobilnet Incorporated, Houston, Tex.

Filed Oct. 31, 1988, Ser. No. 265,183
Int. Cl.[5] H04M *1/57*
U.S. Cl. 379—91 **42 Claims**



1. A Customer Activation System for expeditiously providing a CMR customer access to CMR service, the System comprising:

a regional processor programmed to:

(a) accept information identifying the CMR customer;

(b) obtain a credit check of the CMR customer;

(c) assign a telephone number to the CMR customer; and

(d) insert and activate the telephone number in a cellular switch.

4,958,369

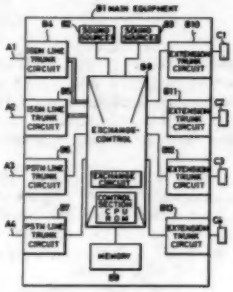
KEY TELEPHONE SYSTEM ACCOMMODATING BOTH DIGITAL AND ANALOG TELEPHONE NETWORKS

Shinji Tsuchida, Zama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 20, 1989, Ser. No. 425,022
Claims priority, application Japan, Oct. 24, 1988, 63-266148
Int. Cl.[5] H04M *1/00, 1/72*
U.S. Cl. 379—156 **7 Claims**

1. A key telephone system in which both a line in a digital network and a public switched analog telephone network are accommodated as external lines in the main equipment of the system, and in which extension telephone sets connected to at least two extension lines are each able to call out another terminal over an external line which may be either the digital line or the analog line, comprising:

a determining means for determining which type is the external line acquired in response to a calling-out command from one of said extension telephone sets, whether it is the digital line or the analog line; and



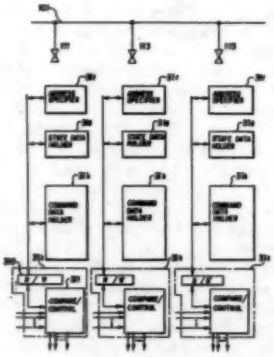
an informing means for informing, on the basis of the result of the determination of said determining means, said extension telephone set of the type of the acquired external line.

4,958,370

CONTROL SYSTEM FOR A PLURALITY OF TELEPHONE SETS

Masanobu Shimanuki, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 4, 1988, Ser. No. 177,170
Claims priority, application Japan, Apr. 3, 1987, 62-81085
Int. Cl.[5] H04M *1/00*
U.S. Cl. 379—157 **12 Claims**



1. A control system for a plurality of telephone sets connected as branched at one end to a central office line, each of the telephone sets being defined as a predetermined telephone set and comprising:

control information inputting means for inputting a control information data sequence indicative of a request to other telephone sets connected as branched to the central office line to perform a desired control operation and indicative of at least one of the other telephone sets of said plurality of telephone sets being requested;

control signal sending means for sending to the central office line an output control signal for controlling the other telephone sets connected as branched to the central office line corresponding to the control information data sequence inputted into the control information inputting means;

control signal receiving means for receiving an input control signal sent from any other one of said telephone sets via the central office line; and

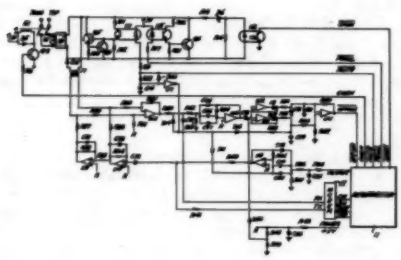
control means for performing a predetermined operation corresponding to a control information data sequence contained in the input control signal received by the control signal receiving means.

4,958,371

METHOD AND APPARATUS FOR DETERMINING WHEN A TELEPHONE HANDSET IS OFF-HOOK

Joseph A. Damoci, Beltsville; Matthew F. Kern, Catonsville, both of Md.; Russell J. Welsh, and John D. Fourdraine, both of Toronto, Canada, assignors to Control Data Corporation, Minneapolis, Minn.

Filed Apr. 19, 1988, Ser. No. 183,065
Int. Cl.[5] H04M *11/00*
U.S. Cl. 379—377 **5 Claims**



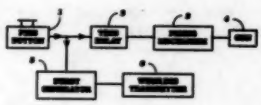
3. A method of operating an automatic telecommunication system including a central location and at least one remote location and wherein a data reporting system including a modem is situated at the remote location for establishing data communications with the central location over the switched telephone network, comprising the steps of determining prior to initiating communication with the central location whether a telephone at the remote location is off-hook and inhibiting communications with the central location is a telephone is off-hook, and further comprising the step of determining during the time that communications are established with the central location whether a telephone at the remote location goes off-hook includes generating a test signal and applying the test signal between ring and tip of a telephone line, providing the first and second integrator means having respectively short and relatively long integration time constants for integrating the test signal, comparing the integrated signal outputs of said first and second integrators, whereby a substantial difference between the integrated signal outputs of said first and second integrators is indicative that an additional load has been placed between tip and ring of the telephone line, corresponding to a telephone going off hook.

4,958,372

HEARING PROTECTOR UTILIZING AURAL REFLEX MECHANISM

Norman L. Carter, East Roseville, Australia, assignor to The Commonwealth of Australia, Phillip, Australia

Filed Mar. 25, 1989, Ser. No. 327,740
Claims priority, application Australia, Oct. 12, 1987, PI4832
Int. Cl.[5] A61F *11/02*
U.S. Cl. 381—72 **4 Claims**



1. A method of enhancing the protection of hearing in an environment where brief, intense sounds are produced, said method comprising the steps of

(a) supplying each person in the environment with an electronic earmuff having (i) a protective shell adapted to surround the ear of a wearer of the earmuff, (ii) a microphone outside the protective shell, and (iii) an automatic gain control system for controlling the level of signals from the microphone, the output of the automatic gain control system being input to a loudspeaker mounted within the protective shell; the electronic earmuff also including a wireless receiver having its output connected to said loudspeaker; and

(b) transmitting, immediately before the production of a brief, intense sound, a radio frequency signal that is received by said wireless receiver, said radio frequency signal being modulated so that, upon its receipt by said wireless receiver, the wireless receiver produces an output signal which causes said loudspeaker to generate a loud but non-damaging sound adjacent to the ear of said wearer of the earmuff;

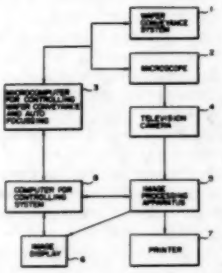
whereby the middle ear muscles of the wearer of the earmuff are contracted immediately prior to the reception, by said wearer, of the brief, intense sound.

4,958,373

DEFECT-RECOGNITION PROCESSING APPARATUS

Toshiro Usami; Hiroyuki Kamijo, both of Yokohama; Takao Ohta, Tokyo, and Masanobu Ogino, Yokosuka, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 29, 1988, Ser. No. 174,879
Claims priority, application Japan, Mar. 31, 1987, 62-78659
Int. Cl.[5] G06K *9/00*
U.S. Cl. 382—8 **14 Claims**



1. A defect-recognition processing apparatus comprising:

image converting means for converting, into an image, sur-

face data corresponding to a predetermined area on a surface of an object being inspected;

image processing means for processing the image from said image converting means and for detecting the presence of a defect image having both a length greater than a predetermined value and a ratio L_Y/L_X having a value greater than n or a value lower than 1/n where L_Y denotes a length of the defect image in a longitudinal direction and L_X denotes a length of the defect image in a lateral direction; and

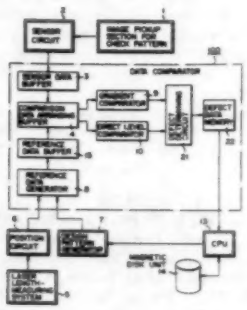
system control means for controlling operations performed by said image processing means.

4,958,374

METHOD OF CHECKING PATTERN AND APPARATUS THEREFOR

Masakazu Tokita, Fuji, and Izumi Kasahara, Numazu, both of Japan, assignors to Toshiba Machine Company, Ltd., Tokyo, Japan

Filed Aug. 3, 1988, Ser. No. 227,796
Claims priority, application Japan, Mar. 4, 1988, 63-49761
Int. Cl.[5] G06K 9/00
U.S. Cl. 382—8 **16 Claims**



1. A method of checking a defect occurring in a check pattern by comparing the check pattern with a reference pattern, comprising the steps of:

generating check and reference image data each including pixel data and density data, the pixel data representing pixels defining check and reference patterns and density data representing densities corresponding to the brightness of the pixels;

converting the image data of the check and reference patterns into density gradient vector data of the pixels of the check and reference patterns, the density gradient vector data including gradient vectors peculiar to the pixels and the gradient vector corresponding to an interest pixel being obtained from distribution of the densities of a plurality of the peripheral pixels located around the interest pixel; and

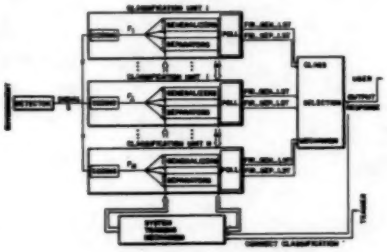
detecting a defect included in the check pattern data by comparing the converted density gradient vector data of the pixels of the check and reference patterns with each other.

4,958,375

PARALLEL, MULTI-UNIT, ADAPTIVE PATTERN CLASSIFICATION SYSTEM USING INTER-UNIT CORRELATIONS AND AN INTRA-UNIT CLASS SEPARATOR METHODOLOGY

Douglas L. Reilly, Providence; Christopher L. Scofield, Barrington; Leon N. Cooper, and Charles Elbaum, both of Providence, all of R.I., assignors to Nestor, Inc., Providence, R.I.

Filed Feb. 17, 1988, Ser. No. 156,830
Int. Cl.[5] G06K 9/62
U.S. Cl. 382—14 **19 Claims**



1. In a system for classification and identification of patterns, each pattern being represented by an input signal S, said system comprising at least one classification unit U_i including:

(1) pattern feature encoding means, responsive to said signal S, for producing an intermediate signal F, comprised of signal components $F_1, F_2 \ldots F_i \ldots F_k$, representative of features contained in the pattern represented by said signal S; and

(2) pattern classification means, responsive to said intermediate signal F, for producing an output signal R_i representative of a proposed respective class of said pattern represented by said signal S as identified by the features represented by said intermediate signal F;

the improvement wherein said pattern classification means include:

(a) generalizer means comprising:

(i) memory means for storing a plurality of generalizer prototypes within a multi-dimensional pattern space, each generalizer prototype including, as prototype information stored in said memory means: a vector location in said pattern space; a scalar distance, in a given range between a minimum and maximum value, defining the size of a region of influence about said vector location of said generalizer prototype; and a particular class with which said generalizer prototype is associated; and

(ii) means for comparing the vector location of an input pattern, represented by said intermediate signal F, with a plurality of said generalizer prototypes stored in said memory means to determine whether said input pattern location falls within a region of influence of at least one of said generalizer prototypes, and for producing a generalizer output classification response, indicative of the class associated with said at least one generalizer prototype, if said input pattern location falls within the region of influence thereof;

(b) separator means comprising:

(i) memory means for storing a plurality of separator prototypes within said pattern space, each separator prototype including, as prototype information stored in said memory means: a vector location in said pattern space; a scalar distance defining the size of a region of influence about said vector location of said separator prototype; a particular class with which said separator prototype is associated; the identity of a pair of generalizer prototypes with which said

separator prototype is associated; and an index specifying a portion of the signal components $F_1, F_2 \ldots F_i \ldots F_k$ of the pattern space holding the generalizer prototypes with which said separator prototype is associated;

(ii) means for comparing the location of an input pattern, represented by the signal components of said intermediate signal F identified by the respective index of a separator prototype, with at least one of said separator prototypes stored in said memory means to determine whether said input pattern location falls within a region of influence of such separator prototype, and for producing a separator output classification response, indicative the class of said input pattern, if said input pattern location falls within the region of influence of such separator prototype; and

(c) polling means, responsive to said generalizer means and said separator means, for producing a classification unit output signal R_i, in dependence upon said generalizer and separator output classification responses;

thereby to identify patterns which fall within the regions of influence of a plurality of generalizer prototypes.

4,958,376

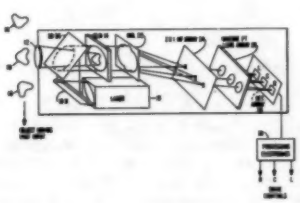
ROBOTIC VISION, OPTICAL CORRELATION SYSTEM

Kenneth G. Leib, Wantagh, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Continuation-in-part of Ser. No. 814,209, Dec. 27, 1985, abandoned. This application Aug. 25, 1988, Ser. No. 236,519

Int. Cl.[5] G06K 9/00

U.S. Cl. 382—31 **15 Claims**



1. A system for optically comparing an input image with optical information stored in matched filters to provide identification and aspect information about the input image, comprising:

a. a spatial light modulator, having incident thereon an input image to be analyzed, which spatially modulates a coherent beam of radiation to form a spatially modulated radiation beam;

b. a multiple holographic lens having the spatially modulated radiation beam incident thereon, for performing a multiple number of Fourier transformations thereon to obtain an array of a multiple set of Fourier transforms of the spatially modulated radiation beam;

c. an array of matched filters having the array of Fourier transforms incident thereon, with each matched filter comprising a Fourier transform hologram of an aspect view of an object of interest and passing an optical correlation signal in its matched filter channel in dependence upon the degree of correlation of the Fourier transform of the spatially modulated radiation beam with the Fourier transform recorded by the matched filter;

d. an inverse Fourier transform lens means, receiving the optical correlation outputs of said array of matched filters, for performing an inverse Fourier transformation on each optical correlation output;

e. a detector means for detecting the inverse Fourier transform of each optical correlation output, and for producing a detector output signal representative of each optical correlation output;

.f a normalizing means for each matched filter channel for producing a normalized detector output signal therefrom; and

g. comparator means for comparing the magnitudes of the normalized detector output signals to generate output directional control signals therefrom, as determined by the aspect information about the input image.

4,958,377

CHARACTER STRING IDENTIFICATION DEVICE WITH A MEMORY COMPRISING SELECTIVELY ACCESSIBLE MEMORY AREAS

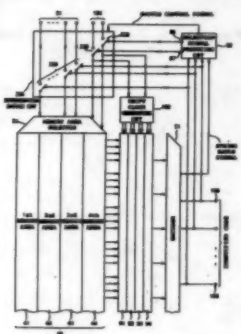
Kousuke Takahashi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jan. 20, 1988, Ser. No. 146,164

Claims priority, application Japan, Jan. 20, 1987, 62-11627; Jan. 22, 1987, 62-13568; Feb. 9, 1987, 62-28546; Aug. 10, 1987, 62-200208

Int. Cl.[5] G06K 9/00

U.S. Cl. 382—34 **2 Claims**



1. A character string identification device for identifying a sequence of input characters to produce an identified code indicative of a result of identification, said character string identification device comprising:

associative memory means, having memory locations for preliminarily storing a plurality of memorized characters and for deciding a best match between each of said input characters and one of said memorized characters and for producing a character match signal representative of a memory location for said one of said memorized characters,

sequential processing means, coupled to said associative memory means, for sequentially processing character match signals corresponding to respective input characters to generate a string match signal,

encoding means, coupled to said sequential processing means, for encoding said string match signal into an encoded signal and for producing said encoded signal as said identified code,

said memory locations arranged is first through N-th memory areas, where N represents a predetermined number, said sequential processing means including first through N-th processing sections corresponding to said first through said N-th memory areas, respectively,

signal producing means for producing a selection signal designating one of said first through said N-th memory areas as a specific memory area,

supplying means, coupled to said first through said N-th memory areas and to said signal producing means, for

supplying each of said input characters in response to said selection signal to said specific memory area to cause said specific memory area to produce said character match signal, and

activating means, coupled to said first through said N-th processing sections and to said signal producing means, for activating one of said through said N-th processing sections as a particular processing section associated with said specific memory area to cause said particular processing section to process character match signals supplied from said specific memory area into said string match signal, and

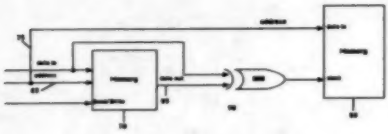
each of said first through said N-th processing sections further including a plurality of stages corresponding to memory locations in each of said memory areas, and each of said stages including holding means for holding a delimiter signal, representative of a delimiter of a string of said memorized characters, in each of said memory areas.

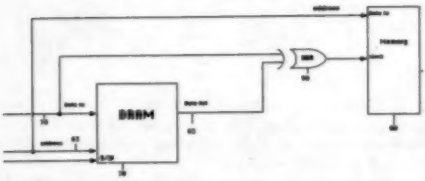
4,958,378

METHOD AND APPARATUS FOR DETECTING CHANGES IN RASTER DATA

Alan E. Bell, Westford, Mass., assignor to Sun Microsystems, Inc., Mountain View, Calif.

Filed Apr. 26, 1989, Ser. No. 343,866
Int. Cl.[5] G06K *9/00*
U.S. Cl. 382—34 **32 Claims**





1. In a computer graphics system for the generation and display of raster data images comprising a central processing unit (CPU) coupled to a memory means, said CPU further being coupled to a display means for the display of a raster data image, said raster data image comprising a plurality of pixels, each pixel identified at an X-Y coordinate location within the raster data image, a method for comparing a first and a second raster data image in real time wherein a pixel at a specific X-Y coordinate location in the second raster data image is compared to a pixel at the specific X-Y coordinate location in the first raster data image as each pixel of the second raster data image is generated, said method comprising the steps of:

writing the first raster data image into memory such that each pixel data representative of a pixel at a predetermined X-Y coordinate location in the image is written to predetermined memory location;

receiving a pixel data of the second image being generated, said pixel data representative of a pixel located at a specific X-Y coordinate location in the second raster data image;

reading the first raster data image stored in memory to retrieve pixel data corresponding to a pixel in the first raster data image at the specific X-Y coordinate location;

inputting to a comparator circuit the pixel data read from memory and the pixel data of the second raster data image received; and

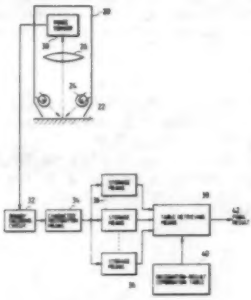
if the comparator output indicates that the pixel data read from memory and the pixel data of the second raster data image are not the same, recording the identification of the X-Y coordinate location of the pixel data to indicate that the pixel data has changed.

4,958,379

OPTICAL CHARACTER READER FOR OUTPUTTING A CHARACTER FROM COMBINATIONS OF POSSIBLE REPRESENTATIONS OF THE CHARACTER

Mikio Yamaguchi, and Naoki Maeda, both of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jan. 3, 1989, Ser. No. 292,930
Claims priority, application Japan, Jan. 4, 1988, 63-531
Int. Cl.[5] G06K *9/22*
U.S. Cl. 382—59 **10 Claims**



1. An apparatus for reading a character from a surface comprising:

a light source directed upon said surface;

an image sensor for detecting during a scanning operation light directed from said surface, said image sensor outputting a signal in response to said light directed from said surface during said scanning operation;

recognition means, responsive to said signal, for determining a corresponding result of recognition during a scan from a predetermined set of recognizable characters; and

character determining means for determining said character from said surface, responsive to a plurality of said results of recognition during a corresponding plurality of scans, said character determining means comprising:

combination storing means for outputting said character, said combination storing means storing only combinations of recognition predetermined to be possible representations of said character, and

retrieving means for retrieving said character from said combination storing means when said plurality of results of recognition corresponds to one of said predetermined combinations of recognition.

4,958,380

FAULT CURRENT LIMITER FOR DC MOTOR DRIVE SYSTEM

Serge L. Scuccato, Peterborough, and Andrew C. Stevenson, Bailieboro, both of Canada, assignors to General Electric Canada Inc., Mississauga, Canada

Filed May 10, 1989, Ser. No. 349,609
Claims priority, application Canada, May 19, 1988, 567250
Int. Cl.[5] A02P *3/14*
U.S. Cl. 388—806 **4 Claims**

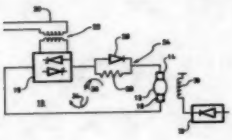
1. A direct current motor drive system comprising:

a direct current motor operable in a forward motoring mode receiving current from a power source and in a reverse

inversion mode providing inversion current to the power source;

converter means for controlling motor operation, the converter means converting alternating current, received from the power source, to direct current and supplying direct current across terminals of the motor when operating in the forward motoring mode; and,

inversion fault current limiting means for limiting inversion fault currents associated with motor operation in the reverse inversion mode without effecting the supply of current to the motor in the forward motoring mode, the



inversion fault current limiting means being electrically connected in series between the converter means and one armature terminal of the motor, the inversion fault current limiting means including diode switch means connected in parallel with resistance means, the diode switch means conducting during the forward motoring mode to permit the flow of direct current therethrough from the converter means to the motor, and the diode switch means not conducting when the motor is operating in the reverse inversion mode so as to direct inversion current through the resistance means and thereby limit the flow of inversion fault currents.

4,958,381

TWO WAY COMMUNICATION SYSTEM

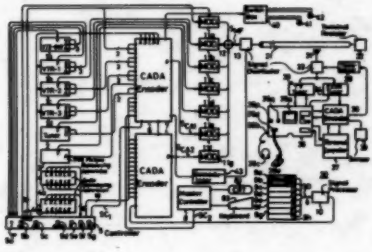
Masakatsu Toyoshima, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Jan. 26, 1988, Ser. No. 148,591

Claims priority, application Japan, Feb. 17, 1987, 62-33945; Feb. 26, 1987, 62-43438; Feb. 26, 1987, 62-43437

Int. Cl.[5] H04H *1/06*

U.S. Cl. 455—4 **10 Claims**



1. A two way communication system, comprising:

(a) a head end apparatus comprising means for generating a polling command signal, and means for receiving a polling answer signal;

(b) a plurality of terminal units each comprising means for decoding said polling command signal, means for generating said polling answer signal in response to said polling command signal, and means for selectively generating a random access signal at each of the terminal units;

(c) means for sending each said polling answer signal to the head end apparatus in a first channel and for sending at least one of said random access signals to the head end apparatus in a second channel; and

(d) means for sending said polling command signal from the head apparatus to each of said terminal units;

wherein said means (c) sends at least one of said random access signals in said second channel when said polling command signal is not supplied to the decoding means.

4,958,382

RADIO TRANSCEIVER APPARATUS FOR CHANGING OVER BETWEEN ANTENNAS

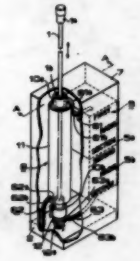
Yasuhito Imanishi, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Hyogo, Japan

Filed Mar. 1, 1989, Ser. No. 317,520

Claims priority, application Japan, Jun. 17, 1988, 63-148372

Int. Cl.[5] H04B *7/08*

U.S. Cl. 455—277 **22 Claims**



1. A radio frequency transceiver apparatus comprising:

a housing for containing the components of the apparatus;

a movable antenna having a body portion and a first distal end movable between an extended position spaced from said housing and a retracted position adjacent said housing, said movable antenna having a second distal end movable within said housing;

an internal antenna disposed within said housing;

transceiver means having a first configuration for processing low level RF signals and a second configuration for processing RF signals of a high level relative to said low level;

switch means having portions integral with the body portion of said movable antenna for selectively interconnecting said movable antenna and internal antenna to said first and second configurations of the transceiver means in response to movement of said movable antenna between said extended and retracted positions;

coupling means for directly connecting said body portion of the movable antenna to said transceiver means to provide a low loss RF signal path from said movable and internal antennas to said transceiver means; and

said switch means including first and second fixed electrical contacts for operative connection to first and second spaced movable contacts provided on said movable antenna, said first and second fixed contacts being connected to said coupling means, said second movable contact being connected to said first fixed contact when said movable antenna is in said extended position and said first and second movable contacts being connected to said first and second contacts, respectively, in said retracted position, a third movable contact supported by said housing for coupling said internal antenna to said second fixed contact when said movable antenna is in said extended position and separating said internal antenna from said second fixed contact when the movable antenna is in said retracted position.

DESIGN PATENTS

GRANTED SEP. 18, 1990

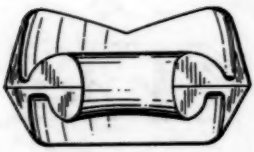
ERRATA

For CLASS	See PATENT NO.
D10-024	310,634
D06-500	310,636
D21-074	310,685
D24-023	310,731

DESIGNS

SEPTEMBER 18, 1990

310,595
CONFECTIONARY
Charles K. Sawyer, 26940 Lime City Rd., Perrysburg, Ohio 43551
Filed Jul. 6, 1987, Ser. No. 69,932
Term of patent 14 years
U.S. Cl. D1—108



310,596
CAPED LEOTARD
Annette Burger, 6209 Mazwood Rd., Rockville, Md. 20852
Filed Feb. 24, 1989, Ser. No. 314,412
Term of patent 14 years
U.S. Cl. D2—29

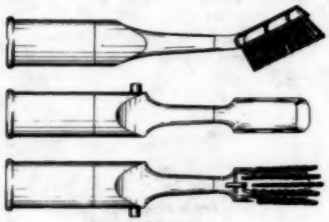
310,597
BIB
Daniel C. Long, and Dale G. Welch, both of Newton, N.C., assignors to Unico Products, Newton, N.C.
Continuation-in-part of Ser. No. 112,758, Oct. 23, 1987, abandoned. This application Jan. 21, 1988, Ser. No. 146,774
Term of patent 14 years
U.S. Cl. D2—229

310,598
BLOCKER SOLE WITH TAP INSERT
Craig C. Cummings, Nashville, Tenn., assignor to Acme Boot Co., Inc., Clarksville, Tenn.
Filed May 31, 1989, Ser. No. 359,079
Term of patent 14 years
U.S. Cl. D2—318

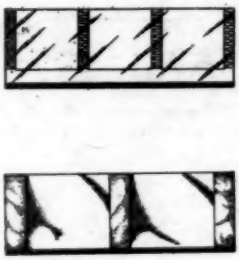
310,599
UMBRELLA HANDLE
Ann S. Cain, Cincinnati, Ohio, assignor to 'totes', incorporated, Loveland, Ohio
Filed Dec. 19, 1988, Ser. No. 286,537
Term of patent 14 years
U.S. Cl. D3—12

310,600
SEPARABLE KEY CHAIN
Siegfried Hölterscheidt, Hückelhoven, Fed. Rep. of Germany, assignor to Walter Henkels GmbH, Fed. Rep. of Germany
Filed Mar. 21, 1988, Ser. No. 171,520
Claims priority, application Fed. Rep. of Germany, Jan. 9, 1988, MR183
Term of patent 14 years
U.S. Cl. D3—62

310,601
SOAP DISPENSER COMBINED WITH A BRUSH
Ole Byriel, Jyllinge, Denmark, assignor to Eveline A/S, Denmark
Filed Mar. 28, 1988, Ser. No. 174,327
Term of patent 14 years
U.S. Cl. D4—114

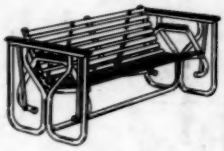


310,602
MULTIPLE PICTURE FRAME
George Hatzipanagos, M.S. Sovereign of the Sea, 5th Floor, 1007 North America Way, Miami, Fla. 33132
Filed Oct. 14, 1986, Ser. No. 918,873
Term of patent 14 years
U.S. Cl. D6—301



310,603
VANITY BENCH
H. Thomas Keller, High Point, N.C., assignor to Rosalco, Inc., Louisville, Ky.
Division of Ser. No. 238,511, Aug. 31, 1988. This application Mar. 29, 1989, Ser. No. 320,371
Term of patent 14 years
U.S. Cl. D6—349

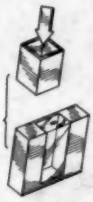
310,604
GLIDER
Charles Pomeroy, and John T. Bycraft, both of South Bend, Ind., assignors to Jack-Post Corporation, Buchanan, Mich.
Continuation of Ser. No. 766,765, Aug. 16, 1985. This application Nov. 5, 1987, Ser. No. 119,245
Term of patent 14 years
U.S. Cl. D6—347



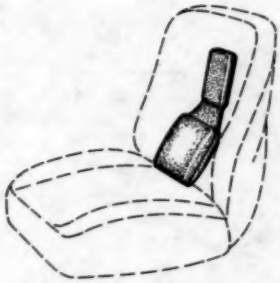
310,605
COLLAPSIBLE CHAIR
Sun E. Kwon, Seoul, Rep. of Korea, assignor to Total Design Corporation, Seoul, Rep. of Korea
Filed Mar. 5, 1987, Ser. No. 22,353
Claims priority, application Rep. of Korea, Jan. 8, 1987, 87-74
Term of patent 14 years
U.S. Cl. D6—368

310,606
VANITY CHAIR
H. Thomas Keller, High Point, N.C., assignor to Rosalco, Inc., Louisville, Ky.
Division of Ser. No. 238,511, Aug. 31, 1988. This application Mar. 29, 1989, Ser. No. 320,372
Term of patent 14 years
U.S. Cl. D6—380

310,607
PROMOTIONAL CONTENT KIOSK
Lawrence T. Penna, 1500 NW. 49th St., Suite 500, Fort Lauderdale, Fla. 33309
Filed Jan. 29, 1988, Ser. No. 149,873
Term of patent 14 years
U.S. Cl. D6—481

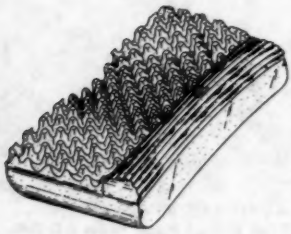


310,608
DRIVER'S SUPPORT CUSHION
John Axell, Bend, Oreg., assignor to Spine-O-Pedic Cushions, Inc., Bend, Oreg.
Filed Jan. 25, 1988, Ser. No. 148,238
Term of patent 14 years
U.S. Cl. D6—601



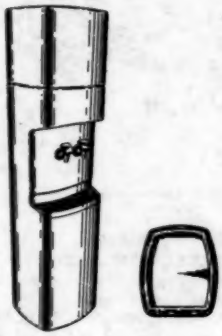
310,609
ORTHOPEDIC CERVICAL PILLOW
George J. Burkhardt, 531 Howard Rd., Cherry Hill, N.J. 08034
Filed Apr. 6, 1988, Ser. No. 178,086
Term of patent 14 years
U.S. Cl. D6—601

310,610
ANTI-SNORING PILLOW
Linda H. Dixon, Ross, Calif., assignor to E.R. Carpenter Company, Inc., Richmond, Va.
Continuation of Ser. No. 190,847, May 6, 1988. This application Apr. 24, 1989, Ser. No. 342,426
Term of patent 14 years
U.S. Cl. D6—601



310,611
TACO HOLDER OR THE LIKE
Robert W. Pittman, 637 Cauthen St., Rock Hill, S.C. 29730
Filed Aug. 12, 1986, Ser. No. 895,751
Term of patent 14 years
U.S. Cl. D7—504

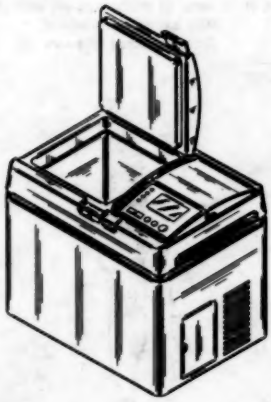
310,612
WATER REFRIGERATION AND DISPENSING UNIT
André Desrosiers, Montreal, Canada, assignor to André Desrosiers Designer Industriel (ADDI) Inc., Montreal, Canada
Filed Mar. 18, 1987, Ser. No. 27,233
Term of patent 14 years
U.S. Cl. D7—307



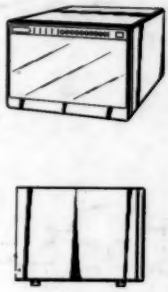
310,613
COFFEE MAKER OR SIMILAR ARTICLE
Tsann-Kuen Wu, Tainan Hsien, Taiwan, assignor to Tsann Kuen Enterprise Co., Ltd., Taiwan, Taiwan
Filed Feb. 10, 1988, Ser. No. 154,622
Term of patent 14 years
U.S. Cl. D7—309

310,614
CONTAINER FOR LIQUID FOODSTUFFS
Ambrogio Pozzi, Gallarate, Italy, assignor to Fratelli Guzzini S.p.A., Recanati, Italy
Filed Oct. 16, 1987, Ser. No. 109,252
Claims priority, application Italy, Apr. 27, 1987, 21464/87[U]
Term of patent 14 years
U.S. Cl. D7—317

310,615
BREAD BAKING MACHINE
Isao Kitai; Kenichi Matsuda, and Mikio Ogasawara, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Feb. 16, 1988, Ser. No. 156,235
Claims priority, application Japan, Aug. 17, 1987, 62-33482
Term of patent 14 years
U.S. Cl. D7—348

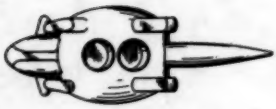


310,616
MICROWAVE OVEN
Kanji Murai, Kanagawa, and Jun Matsumoto, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan
Filed May 2, 1988, Ser. No. 189,596
Claims priority, application Japan, Nov. 17, 1987, 62-46759
Term of patent 14 years
U.S. Cl. D7—351



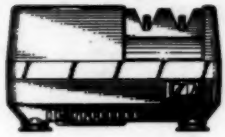
310,617
FOODSTUFFS CONTAINER
Ambrogio Pozzi, Gallarate, Italy, assignor to Fratelli Guzzini S.p.A., Recanati, Italy
Filed Oct. 16, 1987, Ser. No. 109,426
Claims priority, application Italy, Apr. 27, 1987, 21464/87[U]
Term of patent 14 years
U.S. Cl. D7—538

310,618
BEVERAGE CONTAINER HOLDER
Nancy C. Ritchel, 12747 Leader, Houston, Tex. 77072, and Benny G. Ritchel, 23014 Calderbrook, Katy, Tex. 77449
Filed Feb. 26, 1987, Ser. No. 19,495
Term of patent 14 years
U.S. Cl. D7—617



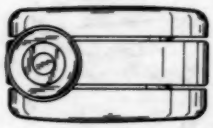
310,619
GOLF COURSE BUNKER RAKE HEAD
Uli Schade, Neu-Ulm, Fed. Rep. of Germany, assignor to Firma Technobrom Messe GmbH, Munderkingen, Fed. Rep. of Germany
Filed Aug. 19, 1988, Ser. No. 234,435
Claims priority, application Fed. Rep. of Germany, Feb. 19, 1988, 599/88
Term of patent 14 years
U.S. Cl. D8—13

310,620
KNIFE SHARPENER
Daniel D. Friel, Winward Rd., Greenville, Del. 19807
Filed Feb. 1, 1988, Ser. No. 150,924
Term of patent 14 years
U.S. Cl. D8—93



310,621
FOLDING KNIFE
Lynn C. Thompson, 987 Sand Piper Ct., Ventura, Calif. 93001
Filed Oct. 26, 1987, Ser. No. 112,426
The portion of the term of this patent subsequent to Mar. 5, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D8—99

310,622
CASTOR
Stafford T. Screen, Stourbridge, England, assignor to Colson Castors (Europe) Limited, West Midlands, England
Filed Jul. 21, 1986, Ser. No. 888,390
Claims priority, application United Kingdom, Jan. 21, 1986, 1031733
Term of patent 14 years
U.S. Cl. D8—375



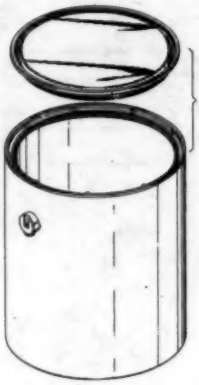
310,623
BRACKET FOR CLOSET SHELF SUPPORT ROD
Ernesto E. Araniber, Miami, Fla., assignor to Shelfco, Inc., Ft. Lauderdale, Fla.
Filed Feb. 1, 1988, Ser. No. 150,726
Term of patent 14 years
U.S. Cl. D8—380

310,624
RETAINING CLIP
Raymond J. Gradecki, Mundelein; Gerald R. Sorensen, Elgin, and Daniel J. Finkiewicz, Elk Grove Village, all of Ill., assignors to National Creative Merchandising Corp., Arlington Heights, Ill.
Filed Nov. 14, 1988, Ser. No. 271,070
Term of patent 14 years
U.S. Cl. D8—395

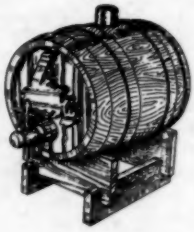
310,625
PACKING BAG FOR DISPOSABLE CAMERA
Takuya Arai, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan
Filed Nov. 24, 1986, Ser. No. 934,452
Claims priority, application Japan, May 23, 1986, 61-19618
Term of patent 14 years
U.S. Cl. D9—305

310,626
BOTTLE FOR PERFUME, TOILET WATER OR THE LIKE
Pierre Dinand, Levallois-Perret, France, assignor to Etablissements Bernard Lalande, France
Filed May 12, 1986, Ser. No. 862,589
Claims priority, application France, Nov. 26, 1985, 855 572
Term of patent 14 years
U.S. Cl. D9—322

310,628
CONTAINER
Adrien P. Rayner, Malmesbury, England, assignor to CMB Packaging (UK) Limited, England
Filed Jan. 20, 1987, Ser. No. 4,701
Claims priority, application United Kingdom, Jul. 23, 1986, 1035564
Term of patent 14 years
U.S. Cl. D9—352



310,627
BEVERAGE CONTAINER
Andrew V. Manuel, P.O. Box 12, Portugal Cove, Newfoundland, Canada (A0A 3K0)
Filed Mar. 21, 1988, Ser. No. 174,681
Claims priority, application Canada, Dec. 31, 1987, 3-12-87-6
Term of patent 14 years
U.S. Cl. D9—325



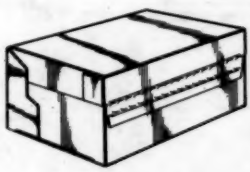
310,629
VACUUM FURNACE BOTTLE
Gregory C. Hoffman, San Marcos, Calif., assignor to Air Products and Chemicals Inc., Allentown, Pa.
Filed Feb. 2, 1987, Ser. No. 10,159
Term of patent 14 years
U.S. Cl. D9—352

310,630
BOTTLE WITH CLOSURE
Francois Thieffry, Paris, France, assignor to Societe D'Etudes de Chimie et de Therapie Appliquees, laboratoires de Cosmetologie Yves Rocher, France
Filed Dec. 30, 1986, Ser. No. 947,968
Claims priority, application France, Sep. 18, 1986, 864.863
Term of patent 14 years
U.S. Cl. D9—384

310,631
BOTTLE
Raymond H. Davis, Geneva, Ill., and Corby K. Mathisen, Allison Park, Pa., assignors to H. J. Heinz Company, Pittsburgh, Pa.
Filed Jul. 7, 1986, Ser. No. 882,694
Term of patent 14 years
U.S. Cl. D9—404

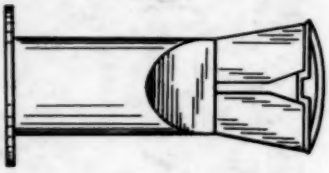
310,632
BOTTLE
Stanley Hutton, West Brattleboro, Vt., assignor to Geka Brush Corporation, Brattleboro, Vt.
Filed May 19, 1987, Ser. No. 51,301
Term of patent 14 years
U.S. Cl. D9—412

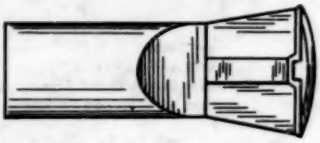
310,633
ICE CREAM CARTON
Richard E. DePaul, Williamsburg, Va., and Frank G. Capuano, Rochester, N.Y., assignors to Somerville Packaging Corporation, Newport News, Va.
Filed Dec. 28, 1987, Ser. No. 138,026
The portion of the term of this patent subsequent to Dec. 15, 2001, has been disclaimed.
Term of patent 14 years
U.S. Cl. D9—416

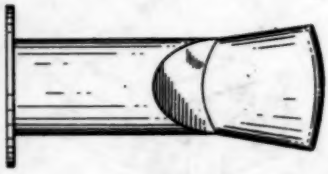


310,634
CLOCK
Keiko Nomura, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan
Filed Sep. 10, 1986, Ser. No. 905,943
Claims priority, application Japan, Mar. 14, 1986, 61-9200
Term of patent 14 years
U.S. Cl. D10—24

310,635
NOZZLE TIP FOR A DISPENSER OF SEALANT OR ADHESIVE
Dave E. Schultz, South Bend, and Ron F. Riede, Granger, both of Ind., assignors to Uniroyal Plastics Company, Inc., Mishawaka, Ind.
Filed Nov. 2, 1987, Ser. No. 116,137
Term of patent 14 years
U.S. Cl. D9—447



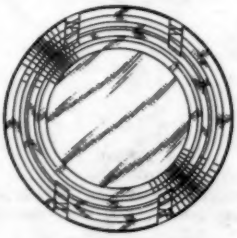




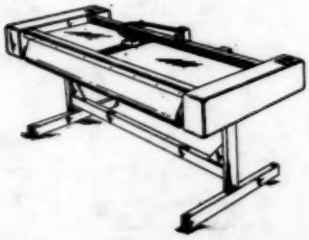
310,636
END STANDARD FOR A SEAT
Gerald P. Skalka, Washington, D.C., assignor to Victor Stanley, Inc., Dunkirk, Md.
Filed May 28, 1987, Ser. No. 58,027
Term of patent 14 years
U.S. Cl. D6—500

310,637
CASE FOR A WATCH
Hisako Sugano, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan
Filed Nov. 26, 1986, Ser. No. 935,556
Claims priority, application Japan, May 29, 1986, 61-20662
Term of patent 14 years
U.S. Cl. D10—30

310,638
CASE FOR A WATCH
Hisako Sugano, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan
Filed Nov. 26, 1986, Ser. No. 935,559
Claims priority, application Japan, May 29, 1986, 61-20661
Term of patent 14 years
U.S. Cl. D10—30

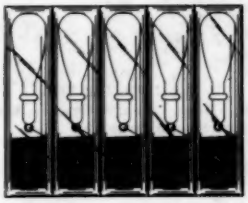


310,639
X, Y PLOTTER
Heinz J. Gerber, West Hartford, Conn., assignor to Gerber Garment Technology, Inc., Tolland, Conn.
Filed May 17, 1988, Ser. No. 194,864
Term of patent 14 years
U.S. Cl. D10—46

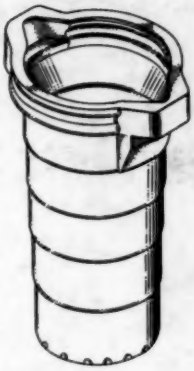


310,640
COMBINED POSTAL AND SHIPPING SCALE
George H. Woods, Fairfield; Richard Ramsey, and Kenneth A. Schulz, both of Bethel, all of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.
Filed Jul. 30, 1987, Ser. No. 79,864
Term of patent 14 years
U.S. Cl. D10—91

310,641
PACKAGE OF RESCUE BALLOON KITS
David L. Miller, 8440 Steven Ave. S., Bloomington, Minn. 55420, and Gene Vatnsdal, 328 NW. 8 St., Fairbault, Minn. 55021
Filed Aug. 21, 1987, Ser. No. 87,906
Term of patent 14 years
U.S. Cl. D10—109

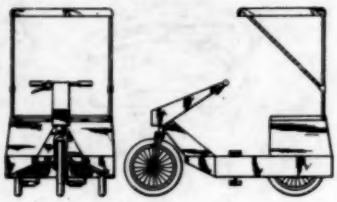


310,642
TRAFFIC CHANNELIZER OR THE LIKE
Jack H. Kulp, San Juan Capistrano, assignor to Traffix Devices, Inc., San Clemente, Calif.
Filed Feb. 25, 1988, Ser. No. 160,087
Term of patent 14 years
U.S. Cl. D10—109



310,643
PLANTER
Ataro Morando, Stockton, Calif., assignor to Lomeli's Statuary, Inc., Stockton, Calif.
Filed Feb. 8, 1988, Ser. No. 153,659
Term of patent 14 years
U.S. Cl. D11—148

310,644
TRICYCLE
Richard L. Koehler, P.O. Box 566, St. James City, Fla. 33956, and Willie E. Koehler, both of 7632 Ivywood Dr., Indianapolis, Ind. 46250
Filed Oct. 30, 1987, Ser. No. 114,383
Term of patent 14 years
U.S. Cl. D12—112

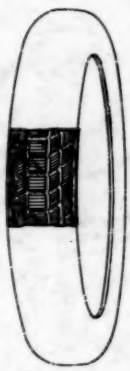


310,645
CONVERTIBLE BABY STROLLER
Francois Julien, Biarritz, France, assignor to Baby Relax, Anglet, France
Filed May 3, 1988, Ser. No. 189,854
Claims priority, application France, Nov. 3, 1987, 786502
Term of patent 14 years
U.S. Cl. D12—129

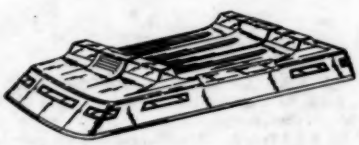
310,646
FOLDABLE ROLLING WALKER
Eric P. Rose, Canoga Park, Calif., assignor to Guardian Products, Inc., Arleta, Calif.
Filed Jan. 11, 1988, Ser. No. 141,896
Term of patent 14 years
U.S. Cl. D12—130

310,647
AUTOMOBILE TIRE
Akihito Mouta, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Oct. 13, 1987, Ser. No. 106,770
Claims priority, application Japan, Apr. 13, 1987, 62-14467
Term of patent 14 years
U.S. Cl. D12—146

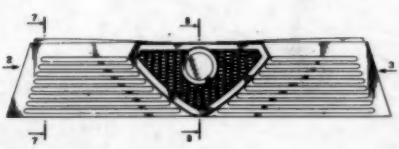
310,648
TIRE
Giancarlo Armellin, Nova Milanese, Italy, assignor to Pirelli Coordinamento Pneumatici S.p.A., Italy
Filed Dec. 7, 1987, Ser. No. 129,671
Claims priority, application Italy, Jun. 26, 1987, 21905/87[U]
Term of patent 14 years
U.S. Cl. D12—146



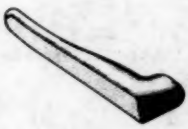
310,649
ROOF MODULE FOR EMERGENCY VEHICLES
Richard D. Lee, P.O. Box 15635, Columbus, Ohio 43215
Filed Feb. 18, 1988, Ser. No. 157,311
Term of patent 14 years
U.S. Cl. D12—156



310,650
FRONT GRILL FOR AN AUTOMOTIVE VEHICLE
Ermanno Cressoni, Arese, Italy, assignor to Alfa Romeo Auto S.p.A., Naples, Italy
Filed Apr. 30, 1985, Ser. No. 729,139
Claims priority, application Italy, Oct. 31, 1984, 23665 /84[U]
Term of patent 14 years
U.S. Cl. D12—163

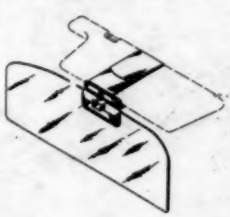


310,651
FINGER GRIP FOR BICYCLE BRAKE LEVERS
Robert D. Grow, 2708 Green Bay Way, Sacramento, Calif. 95826
Filed Feb. 19, 1988, Ser. No. 157,530
Term of patent 14 years
U.S. Cl. D12—179



310,652
SIDE VISOR FOR AUTOMOBILE
Yoichi Nagata, Chigasaki, Japan, assignor to Nagata Kogyo Kabushiki Kaisha, Japan
Filed Mar. 4, 1988, Ser. No. 164,004
Claims priority, application Japan, Oct. 29, 1987, 62-44197
Term of patent 14 years
U.S. Cl. D12—191

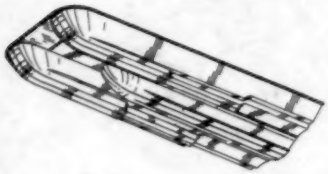
310,653
SUNVISOR FOR VEHICLES
Genya Aizawa, Hayashicho Mansion 201, 30.2 Sendagi 5-chome, Bunkyo-ku, Tokyo, and Kakuhisa Ono, 10-45, Chiyogaoka 6-chome, Aso-ku, Kawasaki-shi, Kanagawa, both of Japan
Filed Apr. 6, 1988, Ser. No. 178,289
Claims priority, application Japan, Oct. 7, 1987, 62-040771
Term of patent 14 years
U.S. Cl. D12—191



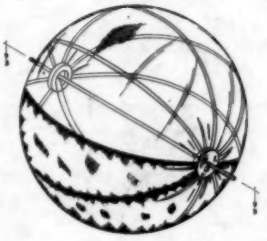
310,654
STROLLER WHEEL HUB CAP
Harry J. Giambrone, Kettering, Ohio, assignor to Spalding & Evenflo Companies, Inc., Tampa, Fla.
Filed Oct. 13, 1988, Ser. No. 257,239
Term of patent 14 years
U.S. Cl. D12—211

310,655
BICYCLE WHEEL SPOKE
Yoo H. Choe, No. B-310, Central Hights Villa, 203-1, Oksu-Dong, Sungdong-Ku, Seoul, Rep. of Korea
Filed Apr. 22, 1988, Ser. No. 184,753
Term of patent 14 years
U.S. Cl. D12—213

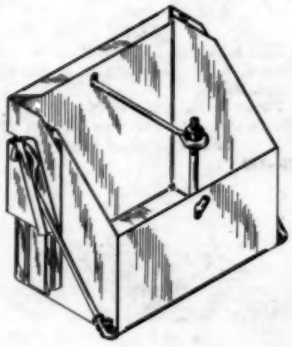
310,656
PONTOON BOAT EXTERIOR HULL
Perry P. Paine, Jr., Ste. 300, First American Center, 200 E. Broadway, P.O. Box 415, Maryville, Tenn. 37803-0415
Filed Mar. 4, 1988, Ser. No. 163,893
Term of patent 14 years
U.S. Cl. D12—300



310,657
INFLATABLE, REFLECTIVE SOLAR OVEN
Rodney Bradford, 1210 Kennamer Dr., SE., Huntsville, Ala. 35801, and Lott W. Brantley, 117 Ninth Ave., Arab, Ala. 35016
Filed Jun. 22, 1987, Ser. No. 64,800
Term of patent 14 years
U.S. Cl. D13—102



310,658
VEHICLE BATTERY HOLDER
Lynn A. Balek, Mason City, Iowa, assignor to LTL Industries Ltd., Mason City, Iowa
Filed Feb. 29, 1988, Ser. No. 161,672
Term of patent 14 years
U.S. Cl. D13—119



310,659

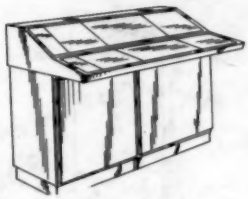
CONSOLE FOR THE OPERATION OF MACHINERY

Alfred Schott, Radebeul; Roland Reichenberger, Coswig; Volker Eichler, Weinboehla, and Horst Schulz, Dresden, all of German Democratic Rep., assignors to VEB Kombinat Polygraph "Werner Lamberz", Leipzig, German Democratic Rep.

Filed Sep. 8, 1986, Ser. No. 905,669

Term of patent 14 years

U.S. Cl. D13—163



310,660

KEYBOARD FOR PROGRAMMABLE CONTROLLER

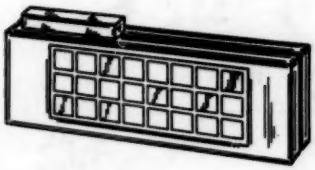
Katsuhiro Ishida, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan

Filed Feb. 6, 1989, Ser. No. 307,582

Claims priority, application Japan, Sep. 7, 1988, 63-35297

Term of patent 14 years

U.S. Cl. D14—100



310,661

CENTRAL PROCESSING UNIT FOR COMPUTER

Hartmut Esslinger, Los Gatos, Calif., assignor to NeXT, Inc., Redwood City, Calif.

Filed Jun. 30, 1988, Ser. No. 214,153

Term of patent 14 years

U.S. Cl. D14—102

310,662

TERMINAL FOR SIGNAL PROCESSING IN TEXTILE LABORATORIES

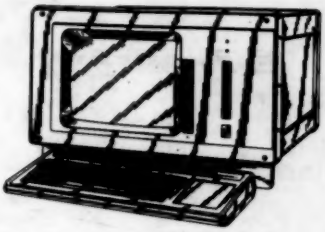
Hans-Rudolf Fellmann, Wagen, and Christophe Apothéloz, Maschwanden, both of Switzerland, assignors to Zellweger Uster Ltd., Uster, Switzerland

Filed Mar. 24, 1987, Ser. No. 29,600

Claims priority, application Switzerland, Sep. 26, 1986, 115437

Term of patent 14 years

U.S. Cl. D14—106



310,663

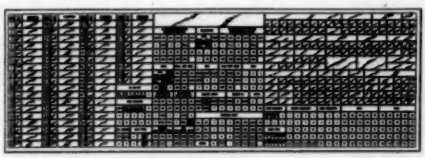
COMPUTER AIDED DESIGN MATRIX MENU FOR OVERLAYING A DIGITIZING TABLET

Wayne C. Fedawa, 8470 Tree Top Ct., N., Apt. 1032, Miamisburg, Ohio 45342

Filed Sep. 29, 1987, Ser. No. 102,092

Term of patent 14 years

U.S. Cl. D14—114



310,664

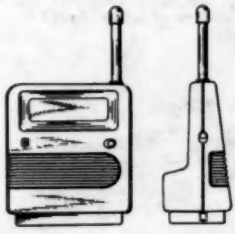
MONITOR RECEIVER

Patrick J. Murphy, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.

Filed Oct. 11, 1988, Ser. No. 256,278

Term of patent 14 years

U.S. Cl. D14—137



310,665

CONTROLLER HOUSING

Duane D. Fortune, Noblesville, Ind.; Richard M. Joffe, Palisades Park, N.J.; Henry J. Mack, Jr., Levittown; John N. McGarvey, Drexel Hill, both of Pa., and Michael P. Zambelli, Maplewood, N.J., assignors to AT&T Company, Murray Hill, N.J.

Filed Apr. 6, 1987, Ser. No. 34,183

Term of patent 14 years

U.S. Cl. D14—140

310,666

COMBINED RADIO AND CASSETTE TAPE RECORDER

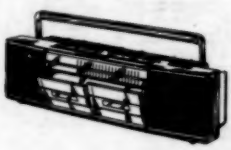
Kazuharu Yamamoto, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 13, 1988, Ser. No. 193,642

Claims priority, application Japan, Nov. 17, 1987, 62-46755

Term of patent 14 years

U.S. Cl. D14—163



310,667

COMBINED TAPE PLAYER AND TUNER

Masahiko Kobayashi, Kamakura, and Kazuharu Yamamoto, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 11, 1988, Ser. No. 166,618

Claims priority, application Japan, Sep. 24, 1987, 62-38495

Term of patent 14 years

U.S. Cl. D14—163

310,668

COMBINED RADIO, CASSETTE TAPE RECORDER AND DIGITAL AUDIO DISK PLAYER

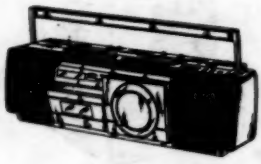
Toshio Takada, Odawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 8, 1988, Ser. No. 179,130

Claims priority, application Japan, Aug. 21, 1987, 62-33666

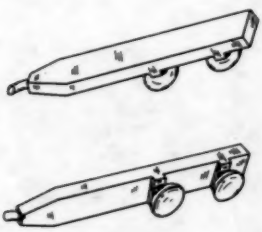
Term of patent 14 years

U.S. Cl. D14—163



310,669
COMBINED TAPE PLAYER AND RADIO TUNER
Takashi Sogabe, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed May 17, 1988, Ser. No. 195,013
Claims priority, application Japan, Nov. 17, 1987, 62-47047
Term of patent 14 years
U.S. Cl. D14—163

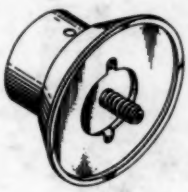
310,670
WINDSHIELD MOUNT RADIO ANTENNA
Jack W. Sheriff, La Jolla, Calif., assignor to Modublox & Co., Inc., La Jolla, Calif.
Filed Jan. 11, 1988, Ser. No. 142,415
Term of patent 14 years
U.S. Cl. D14—230



310,671
INDOOR FM ANTENNA
Reinhold Weiss, 921 Ridge Ave., Evanston, Ill. 60202
Filed May 26, 1988, Ser. No. 199,304
Term of patent 14 years
U.S. Cl. D14—230

310,672
LOOM FRAME OR SIMILAR ARTICLE
Philip R. Harvey, and Jean S. Harvey, both of P.O. Box 416, Mill St., Fontana, Wis. 53125
Filed Feb. 29, 1988, Ser. No. 161,713
Term of patent 14 years
U.S. Cl. D15—66

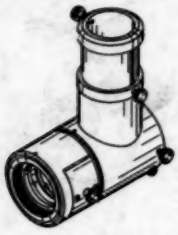
310,673
SCREW CHUCK
Jerry Glaser, 8341 Delgany Ave., Playa Del Rey, Calif. 90293
Filed Jun. 16, 1988, Ser. No. 207,448
Term of patent 14 years
U.S. Cl. D15—140



310,674
COMBINATION MIXING TANK AND A PANEL UNIT
Robert J. Poterala, 140 Rocky Point, Greenville, S.C. 29615
Filed Feb. 16, 1988, Ser. No. 156,100
Term of patent 14 years
U.S. Cl. D15—199

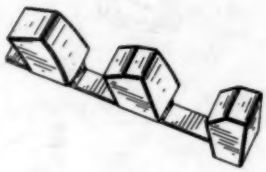
310,675
COMBINED FOLDING BINOCULARS AND AM/FM RADIO
La Huang C., 7F-10, No. 311, Chung Hsiao E. Rd., Sec. 4, Taipei, Taiwan
Filed Aug. 5, 1987, Ser. No. 82,068
Term of patent 14 years
U.S. Cl. D16—133

310,676
MULTIPLE FUNCTION IMAGE SWITCHING ATTACHMENT FOR A TELESCOPE OR SIMILAR ARTICLE
Jeffrey R. Charles, P.O. Box 1892, Camp Verde, Ariz. 86322
Filed Feb. 10, 1988, Ser. No. 155,003
Term of patent 14 years
U.S. Cl. D16—134



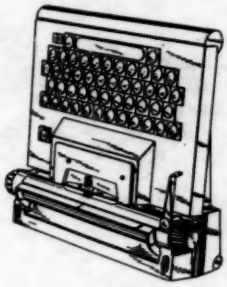
310,677
SUPPORT BASE FOR A CAMERA OR SIMILAR ARTICLE
Noble M. Stidham, Jr.; Victor J. Polyak, and Steve A. Stadelman, all of P.O. Box 1094, Lubbock, Tex. 79408
Filed Jul. 13, 1987, Ser. No. 72,993
Term of patent 14 years
U.S. Cl. D16—242

310,678
KEY UNIT FOR A KEYBOARD MUSICAL INSTRUMENT
Kanpei Takefuji, 27-13-704, Sendagaya 4-chome, Shibuya-ku, Tokyo, and Ritsuko Takefuji, 1-1-208, Kamata 1-chome, Ohta-ku, Tokyo, both of Japan
Filed Jan. 25, 1988, Ser. No. 147,911
Claims priority, application Japan, Jul. 30, 1987, 62-31088
Term of patent 14 years
U.S. Cl. D17—9



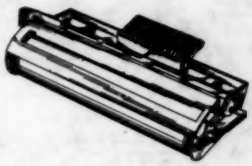
310,679
ELECTRONIC WIND INSTRUMENT
Yasuhiro Kira, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan
Filed Aug. 14, 1987, Ser. No. 86,032
Claims priority, application Japan, Feb. 18, 1987, 62-5895
Term of patent 14 years
U.S. Cl. D17—10

310,680
ELECTRONIC TYPEWRITER
Vid Bratasevec, Izola, Yugoslavia, assignor to Proizvodnja in prodaja igrac, pisal, kovinskih in plasticnih izdelkov "Mehano", p.o., Izola, Yugoslavia
Filed Feb. 23, 1988, Ser. No. 159,571
Claims priority, application Yugoslavia, Sep. 28, 1987, M 604/87
Term of patent 14 years
U.S. Cl. D18—1



310,681
TYPEWRITER
Vid Bratasevec, Koper, Yugoslavia, assignor to Proizvodnja in Prodaja Igrac, Pisal, Kovinskih in Plasticnih Izdelkow "Mehano", P.O., Izola, Yugoslavia
Filed Jul. 19, 1988, Ser. No. 221,172
Claims priority, application Yugoslavia, Jan. 28, 1988, M 57/88
Term of patent 14 years
U.S. Cl. D18—1

310,682
PHOTOCONDUCTOR CARTRIDGE FOR COMPUTER OUTPUT PRINTERS
Yoshitaka Tsumuro, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan
Filed Apr. 17, 1987, Ser. No. 39,486
Claims priority, application Japan, Oct. 17, 1986, 61-41199
Term of patent 14 years
U.S. Cl. D18—40

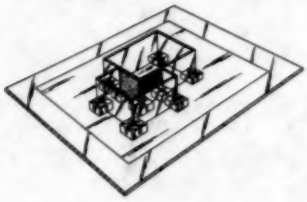


310,683
TONER CASE FOR ELECTROPHOTOGRAPHIC COPIER
Minoru Aoyama, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Nov. 26, 1986, Ser. No. 935,541
Claims priority, application Japan, May 28, 1986, 61-20639
Term of patent 14 years
U.S. Cl. D18—43

310,684
PEN CAP OR SIMILAR ARTICLE
Kunio Itoh, Funabashi, Japan, assignor to Pentel Kabushiki Kaisha, Japan
Filed Nov. 26, 1986, Ser. No. 935,558
Term of patent 14 years
U.S. Cl. D19—57

310,685
SIMULATIVE TOY COASTER
Jeffery A. Berger, 3709 Lisa La., Mesquite, Tex. 75150
Filed Feb. 22, 1989, Ser. No. 313,730
Term of patent 14 years
U.S. Cl. D21—74

310,686
ARCHITECTURAL LEARNING DEVICE
Timothy L. Tacquard, and Patricia B. Gillfillan, both of Laguna Niguel, Calif., assignors to Patall Enterprises, Inc., Laguna Niguel, Calif.
Filed Feb. 13, 1987, Ser. No. 14,732
Term of patent 14 years
U.S. Cl. D19—62



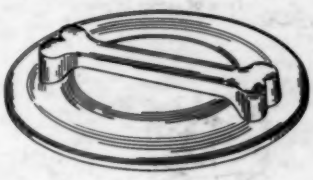
310,687
TAPE APPLICATOR
Abner Berrocasa, Pully, Switzerland, assignor to Capitol Trading S.A., Lausannae, Switzerland
Filed May 11, 1987, Ser. No. 48,121
Claims priority, application Switzerland, Nov. 21, 1986, 115,573
Term of patent 14 years
U.S. Cl. D19—69

310,688
NOTEPAPER DISPENSER
David C. Windorski, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Apr. 3, 1987, Ser. No. 34,323
Term of patent 14 years
U.S. Cl. D19—86

310,689
HOLDER FOR SHEET MATERIAL
Mel Evenson, San Pedro, Calif., assignor to Eldon Industries, Inc., Inglewood, Calif.
Filed Dec. 22, 1986, Ser. No. 944,620
Term of patent 14 years
U.S. Cl. D19—90

310,690
SIGN
Kevin Walsh, 95 Louis St., Whippany, N.J. 07981
Filed May 13, 1988, Ser. No. 194,004
Term of patent 14 years
U.S. Cl. D20—29

310,691
AERIAL TOY
Herbert R. Axelrod, 211 W. Sylvania Ave., Neptune, N.J. 07753
Filed Dec. 22, 1987, Ser. No. 136,922
Term of patent 14 years
U.S. Cl. D21—86



310,692
AERIAL TOY
Michael Harker, 2180 John Adams Pkwy., Idaho Falls, Id. 83401
Filed Mar. 2, 1988, Ser. No. 163,403
Term of patent 14 years
U.S. Cl. D21—86

310,693
SPINNING TOY
Egbert Campbell, 6642 Mather Dr., Marrero, La. 70072
Filed Mar. 22, 1988, Ser. No. 171,540
Term of patent 14 years
U.S. Cl. D21—96

310,694
SPINNING TOY ASSEMBLY
Cecilio Gonzalez, HC 35 - Box 6458, San Lorenzo, P.R. 00754; Carlos Gonzalez, 39 Poplar Gardens, Apartment B, Rochester, N.Y. 14606; Michael Mauzi, Calle CJ8, Jardines de Caguas, and Phillip M. Czechowski, D-10, Calle-1, Altos de la Fuente, both of Caguas, P.R. 00625
Filed Jul. 11, 1988, Ser. No. 216,987
Term of patent 14 years
U.S. Cl. D21—96

310,695
TOY TRAILER
Philip M. Kushner, Greve Strand, and Steen Kyster, Cph. N., both of Denmark, assignors to Interlego A.G., Switzerland
Filed Dec. 2, 1987, Ser. No. 127,877
Term of patent 14 years
U.S. Cl. D21—140

310,696
MOTOR DRIVEN TOY CACTUS
Yasuta Satoh, Nagareyama, and Shinya Saitoh, Tokyo, both of Japan, assignors to Takara Co., Ltd., Tokyo, Japan
Filed Sep. 12, 1989, Ser. No. 406,130
Claims priority, application Japan, Jun. 12, 1989, 1-21657
Term of patent 14 years
U.S. Cl. D21—150

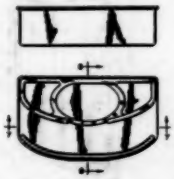
310,697
BICYCLE EXERCISER
Joe Kagayama, Osaka, Japan, assignor to Tsuyama Mfg. Co., Ltd., Osaka, Japan
Filed Apr. 25, 1988, Ser. No. 185,820
Claims priority, application Japan, Oct. 20, 1987, 62-42800
Term of patent 14 years
U.S. Cl. D21—194

310,698
UPRIGHT HOOP UNIT FOR A LAWN GOLF GAME
Hal W. Cooper, 1111 Trisha Ave., Des Moines, Iowa 50313
Filed Jul. 27, 1987, Ser. No. 78,273
Term of patent 14 years
U.S. Cl. D21—202

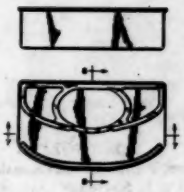
310,699
GOLF PUTTER HEAD
Richard Parente, 877 Stevens Ave., Apt. 4109, Solana Beach, Calif. 92075, and Richard De La Cruz, Lazy 8 Ranch Hwy. 76, Pauma Valley, Calif. 92061
Filed Jan. 12, 1987, Ser. No. 2,504
Term of patent 14 years
U.S. Cl. D21—219

310,700
BOUYANT BELT
Robert S. Jones, Indianapolis, Ind., assignor to Bobber Tech, Inc., Warsaw, Ind.
Filed Feb. 1, 1988, Ser. No. 150,721
Term of patent 14 years
U.S. Cl. D21—238

310,701
TAMPER RESISTANT BAIT TRAY OR SIMILAR ARTICLE
Bryan E. Petersen, Westwood, and Michael Kanceljak, Bloomingdale, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.
Filed Oct. 1, 1987, Ser. No. 54,152
The portion of the term of this patent subsequent to Sep. 18, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D22—119



310,702
TAMPER RESISTANT BAIT TRAY OR SIMILAR ARTICLE
Bryan E. Petersen, Westwood, and Michael Kanceljak, Bloomingdale, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.
Filed Oct. 1, 1987, Ser. No. 54,156
The portion of the term of this patent subsequent to Sep. 18, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D22—119



310,703
INSECT GUARD
Charles R. Johnson, 6786 Pembroke, San Antonio, Tex. 78240
Filed Apr. 11, 1988, Ser. No. 180,273
The portion of the term of this patent subsequent to May 24, 2002, has been disclaimed.
Term of patent 14 years
U.S. Cl. D22—122

310,704
FISHING LURE
John S. Nicosia, Sr., deceased, late of New Britain, Conn., and by John S. Nicosia, Jr., executor, 37 Barberry Dr., Burlington, Conn. 06013
Filed Mar. 30, 1988, Ser. No. 176,388
Term of patent 14 years
U.S. Cl. D22—130

310,705
FISHING LURE
Robert W. Skripko, 102 San Luis Way, Placentia, Calif. 92670
Filed Mar. 7, 1988, Ser. No. 165,199
Term of patent 14 years
U.S. Cl. D22—133

310,706
HOSE NOZZLE
Lawrence P. Heren, Peoria, Ill., and Ronald G. Hayes, Batavia, Ohio, assignors to L. R. Nelson Company, Peoria, Ill.
Filed Jun. 23, 1986, Ser. No. 877,400
Term of patent 14 years
U.S. Cl. D23—226

310,707
PORTABLE WATER PURIFIER FOR HOME USE
Raymond R. Sedman, Reseda, Calif., assignor to United Environmental Technologies, Paoli, Pa.
Filed Jan. 28, 1988, Ser. No. 149,615
Term of patent 14 years
U.S. Cl. D23—209

310,708
COMBINED REVERSIBLE SPRINKLER NOZZLE AND SUPPORT RING
Robert W. Hengesbach, 7886 Munson Rd., Mentor, Ohio 44060
Division of Ser. No. 224,249, Jul. 26, 1988, which is a continuation of Ser. No. 20,684, Mar. 2, 1987, which is a continuation-in-part of Ser. No. 674,272, Nov. 23, 1984, which is a continuation-in-part of Ser. No. 461,874, Jan. 28, 1983, Pat. No. D. 282,392. This application Sep. 28, 1989, Ser. No. 414,067
Term of patent 14 years
U.S. Cl. D23—213

310,709
FAUCET HANDLE
Franz W. Jans, Offenbach Am Main, Fed. Rep. of Germany, assignor to Jado Bathroom and Hardware Manufacturing Corp., Camarillo, Calif.
Filed May 22, 1987, Ser. No. 52,957
Term of patent 14 years
U.S. Cl. D23—250

310,710
SHOWER ENCLOSURE
Keith L. Poulson, Sheboygan, Wis., assignor to Kohler Co., Kohler, Wis.
Filed Jan. 12, 1987, Ser. No. 2,254
Term of patent 14 years
U.S. Cl. D23—283

310,711

COVER FOR A TRANSPORT REFRIGERATION UNIT

Dennis E. Welch, St. Paul, and William L. Waldschmidt, Farmington, both of Minn., assignors to Thermo King Corporation, Minneapolis, Minn.

Filed May 23, 1988, Ser. No. 197,178

Term of patent 14 years

U.S. Cl. D23—325

310,712

FAN HEATER

Miguel L. Del Fresno, Eibar, Spain, assignor to Oficina de Investigacion Agrupada, S.A., Guipuzcoa, Spain

Filed Dec. 20, 1988, Ser. No. 287,962

Claims priority, application Spain, Jun. 21, 1988, 116.270

Term of patent 14 years

U.S. Cl. D23—335

310,713

FAN HOUSING WITH FILTER COMPARTMENT

Max Klein, Shrewsbury, N.J., assignor to Tech Paper, Inc., Pittsfield, Mass.

Filed Apr. 28, 1988, Ser. No. 187,585

Term of patent 14 years

U.S. Cl. D23—381

310,714

TEMPOROMANDIBULAR JOINT DISC SCISSORS

Franklin M. Dolwick, Gainesville, Fla., assignor to Walter Lorenz Surgical Instruments, Inc., Jacksonville, Fla.

Filed Aug. 13, 1987, Ser. No. 84,746

Term of patent 14 years

U.S. Cl. D24—10

310,715

DENTAL HANDPIECE

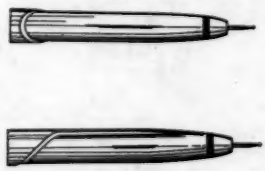
Reinhard Strahammer, Heppenheim, and Werner Schuss, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Division of Ser. No. 106,432, Oct. 6, 1987, Pat. No. Des. 305,935. This application Nov. 22, 1989, Ser. No. 455,731

Claims priority, application Fed. Rep. of Germany, Apr. 6, 1987, MR10/17183

Term of patent 14 years

U.S. Cl. D24—12



310,716

PACIFIER TETHER

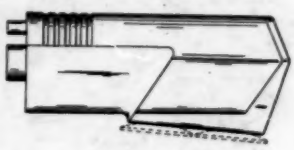
Norma L. Trask, 8752 Hazard Ave., Westminster, Calif. 92683

Filed Jul. 31, 1987, Ser. No. 79,904

Term of patent 14 years

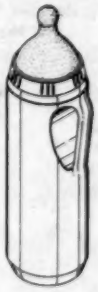
U.S. Cl. D24—34

310,717
WATER JET FOR PRODUCING WHIRLPOOL ACTION IN BATHTUBS
Luc Heiligenstein; Francois Geneve, and Stephen Melamed, all of Chicago, Ill., assignors to Associated Mills Inc., Chicago, Ill.
Filed Dec. 28, 1987, Ser. No. 138,691
Term of patent 14 years
U.S. Cl. D24—38



310,718
CHILD'S TEETHER
Kristine M. Robison, 4041 Medical Dr., Suite 108, San Antonio, Tex. 78229
Filed Jun. 26, 1989, Ser. No. 371,414
Term of patent 14 years
U.S. Cl. D24—45

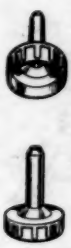
310,719
BABY BOTTLE
William P. Donovan, 28 Quailcrest Rd., East Lyme, Conn. 06333
Filed Mar. 18, 1988, Ser. No. 169,769
Term of patent 14 years
U.S. Cl. D24—47



310,720
BABY WEANING AID
Rhea A. Nielson, 1687 N. 2900 West, Clinton, Utah 84015
Filed Feb. 27, 1989, Ser. No. 316,170
Term of patent 14 years
U.S. Cl. D24—47

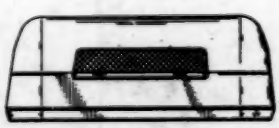
310,721
NOSE TUBE ANCHORING STRIP
Arthur A. Beisang, III, Des Moines, Iowa, assignor to Genetic Laboratories, Inc., St. Paul, Minn.
Filed Feb. 16, 1988, Ser. No. 156,073
Term of patent 14 years
U.S. Cl. D24—49

310,722
CANNULA FOR WITHDRAWING A TEST SAMPLE FROM A TEST TUBE
Bengt-Inge Brodén, Gårfariviigen 3,S-532 00 Skara, Sweden
Filed Jun. 16, 1989, Ser. No. 367,517
Claims priority, application Sweden, Dec. 22, 1988, 88-2956
Term of patent 14 years
U.S. Cl. D24—51



310,723
ATOMIZER
Cheng-Yuan Su, No. 124, Sec. 4, Tung Ta Road, Hsinchu, Taiwan
Filed May 23, 1988, Ser. No. 197,813
Term of patent 14 years
U.S. Cl. D24—62

310,724
UV LAMP FOR CURING FINGERNAIL COATINGS
Ron Jackson, Salt Lake City, Utah, assignor to Pacific Research & Development Corp., Salt Lake City, Utah
Filed Jul. 17, 1989, Ser. No. 380,643
Term of patent 14 years
U.S. Cl. D24—68



310,725
HALOGEN LAMP
Futomi Hayakawa, and Tadashi Nawata, both of Tokyo, Japan, assignors to Kabushiki Kaisha Hybec, Tokyo, Japan
Filed Jan. 5, 1988, Ser. No. 141,614
Term of patent 14 years
U.S. Cl. D26—2

310,726
DECORATIVE LAMP FOR POTTED PLANT
John W. McCullough, c/o Cobra Industries Inc., 3 N. Ridge Ave., Troy, Ohio 45373
Filed May 8, 1987, Ser. No. 48,450
Term of patent 14 years
U.S. Cl. D26—49

310,727
LAMP
James Lu, 6Fl.-3, No. 512, Sec. 4, Chunghsiao E. Rd., Taipei, Taiwan, R.O.C.
Filed Jan. 17, 1989, Ser. No. 297,316
Term of patent 14 years
U.S. Cl. D26—63

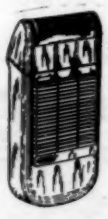
310,728
DESK LAMP OR SIMILAR ARTICLE
James Lu, 6F-3, No. 512, Sec. 4, Chung-Hsiao E. Rd., Taipei, Taiwan, Taiwan
Filed Feb. 8, 1988, Ser. No. 153,339
Term of patent 14 years
U.S. Cl. D26—65

310,729
BATTERY POWERED LAMP
David K. Stearns, Derby, Kans., assignor to Coleman Outdoor Products, Inc., Wichita, Kans.
Filed Jan. 4, 1988, Ser. No. 140,423
Term of patent 14 years
U.S. Cl. D26—110

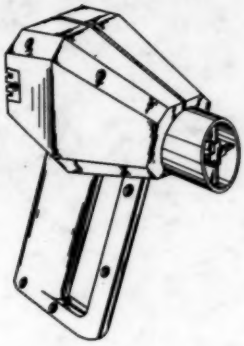
310,730
CIGAR VENTILATOR
Henry A. Sleick, 7049 Wilson Terr., Morton Grove, Ill. 60053, and Edward R. Anton, 110 Harvey Ave., Grayslake, Ill. 60030
Filed Apr. 30, 1987, Ser. No. 45,048
Term of patent 14 years
U.S. Cl. D27—195

310,731
PILL SPLITTER
Nathan S. Lieptz, Beachwood, Ohio, assignor to LGS Corporation, South Euclid, Ohio
Filed Dec. 15, 1986, Ser. No. 941,944
Term of patent 14 years
U.S. Cl. D24—23

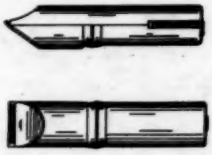
310,732
ELECTRIC SHAVER
Hans T. Meelen, Drachten, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Mar. 9, 1988, Ser. No. 165,876
Claims priority, application Netherlands, Sep. 11, 1987, 62512-00
Term of patent 14 years
U.S. Cl. D28—49



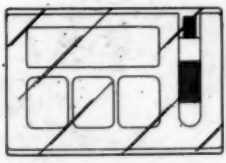
310,733
HAIR BLOWER
Ralph J. Gelinas, Tarzana, Calif., assignor to Trisne Research Corporation, Calabasas, Calif.
Filed Feb. 10, 1988, Ser. No. 154,605
Term of patent 14 years
U.S. Cl. D28—13



310,734
HAIR TRIMMER
George P. Gellanis, Sterling, Ill., assignor to Wahl Clipper Corporation, Sterling, Ill.
Filed Aug. 3, 1987, Ser. No. 80,574
Term of patent 14 years
U.S. Cl. D28—53

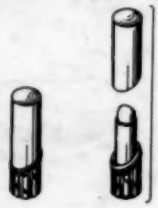


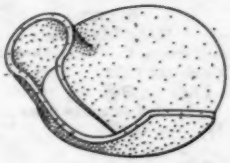
310,735
COSMETIC CONTAINER
Dario Ferrari, Milan, Italy, assignor to Intercos Italia S.p.A., Italy
Filed May 4, 1988, Ser. No. 190,211
Claims priority, application Italy, Nov. 20, 1987, 22748/87[U]
Term of patent 14 years
U.S. Cl. D28—76

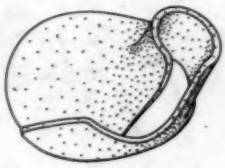


310,736
COSMETIC CASE
Karena Bakic, Varese, Italy, assignor to Conmede Anstalt, Vaduz, Liechtenstein
Filed Dec. 3, 1987, Ser. No. 128,473
Claims priority, application Fed. Rep. of Germany, Jun. 16, 1987, URA838/87
Term of patent 14 years
U.S. Cl. D28—82

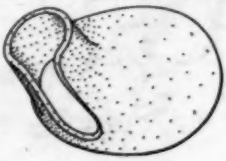
310,737
COSMETIC STICK CONTAINER
Karena Bakic, Varese, Italy, assignor to Cosmede Anstalt, Vaduz, Liechtenstein
Filed Jan. 14, 1988, Ser. No. 143,697
Claims priority, application Fed. Rep. of Germany, Jul. 28, 1987, URA1061/87
Term of patent 14 years
U.S. Cl. D28—88

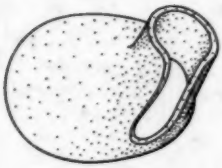




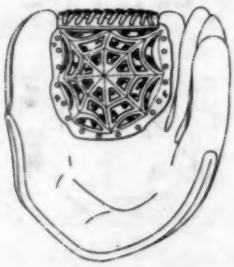


310,738
THUMB PROTECTOR
Michael G. Brown, P.O. Box 8249, Houston, Tex. 77387
Filed Dec. 21, 1987, Ser. No. 135,996
Term of patent 14 years
U.S. Cl. D29—20

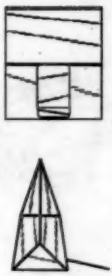




310,739
WEB FOR A BASEBALL GLOVE
Robert L. Clevenhagen, Ava, Mo., assignor to Figgie International Inc., Richmond, Va.
Filed Apr. 15, 1988, Ser. No. 182,039
Term of patent 14 years
U.S. Cl. D29—21

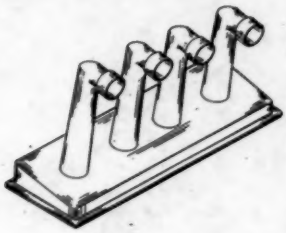


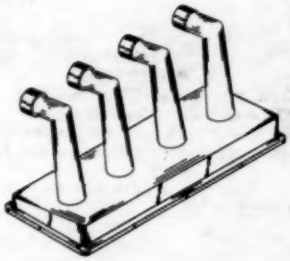
310,740
DISPOSABLE PET LITTER HOUSING
Susan N. Mannschreck, Rte. 4, Box 100, Atoka, Okla. 74525
Filed Jul. 12, 1989, Ser. No. 379,159
Term of patent 14 years
U.S. Cl. D30—161



310,741
LITTER REMOVAL TOOL OR THE LIKE
Phillip J. Moses, 1091 Galesmoore Ct., Westlake Village, Calif. 91361
Filed Jan. 25, 1988, Ser. No. 148,220
Term of patent 14 years
U.S. Cl. D30—162

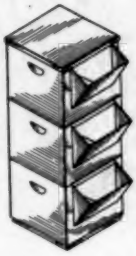
310,742
BOOT AND SHOE DRYER
Douglas Johnson, 639 E. 1275, Shelley, Id. 83274
Filed Jul. 23, 1987, Ser. No. 77,779
Term of patent 14 years
U.S. Cl. D32—58



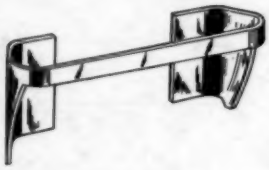


310,743
LOTTERY TICKET SCRAPER
Gregory J. Riddle, 1137 W. Dianron Rd., Palmdale, Calif. 93551
Filed Feb. 25, 1988, Ser. No. 160,105
Term of patent 14 years
U.S. Cl. D32—46

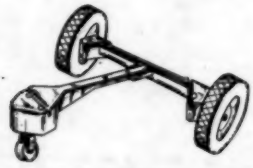
310,744
REFUSE CONTAINER
Sylvester J. Fletcher, P.O. Box, Greendell, N.J. 07839, and Kermit J. Lee, 104 Berkley Dr., Syracuse, N.Y. 13210
Filed Aug. 14, 1987, Ser. No. 85,133
Term of patent 14 years
U.S. Cl. D34—1



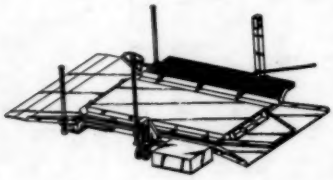
310,745
BAG HOLDER
Patrick Cross, 5 Molope Road, Randpark Ridge Ext. 1, Randburg 2194, Johannesburg, South Africa
Filed Dec. 23, 1987, Ser. No. 142,887
Claims priority, application South Africa, Jun. 26, 1987, 0485/87
Term of patent 14 years
U.S. Cl. D34—6



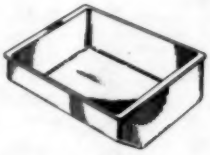
310,746
DOLLY
Robert C. Berfield, Jersey Shore, and Craig A. Seasholtz, Avis, both of Pa., assignors to Shop-Vac Corporation, Williamsport, Pa.
Filed Jan. 20, 1987, Ser. No. 4,682
Term of patent 14 years
U.S. Cl. D34—23



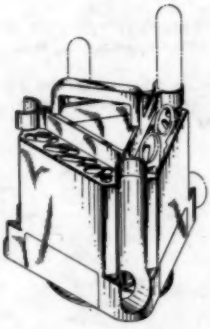
310,747
CONTAINER TRANSFER LIFT
Shunji Isogai, Hekinan, Japan, assignor to Sugiyasu Industries Co., Ltd., Takahama, Japan
Filed Nov. 16, 1988, Ser. No. 272,204
Claims priority, application Japan, Aug. 2, 1988, 63-30969
Term of patent 14 years
U.S. Cl. D34—28



310,748
PARTS DRAWER
Donald Embree, Copley, and David L. Hamann, Cincinnati, both of Ohio, assignors to Rubbermaid Incorporated, Wooster, Ohio
Filed Aug. 10, 1988, Ser. No. 230,506
Term of patent 14 years
U.S. Cl. D34—40



310,749
TOOL CADDY
Jane Ancona, and Bruce Ancona, both of New York, N.Y., assignors to M. Kamenstein, Inc., White Plains, N.Y.
Filed Dec. 5, 1989, Ser. No. 446,171
Term of patent 14 years
U.S. Cl. D34—44



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 18TH DAY OF SEPTEMBER, 1990

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Ahlstrom Corporation: *See*—
Yrjala, Olavi A., 4,957,778, Cl. 427-152.000.

A. O. Smith Corporation: *See*—
Pottebaum, Joseph R., 4,958,118, Cl. 318-727.000.

Aaron, James R.: *See*—
Gwin, Hal S.; and Aaron, James R., 4,957,139, Cl. 137-556.000.

Abbott Laboratories: *See*—
Anderson, Pamela A.; Cipollo, Kent L.; and Mohacsi, Tivadar G., 4,957,938, Cl. 514-412.000.

Abe, Hiroomi: *See*—
Nishio, Taichi; Abe, Hiroomi; Suzuki, Yasurou; Sanada, Takashi; Hosoda, Satoru; and Okada, Takayuki, 4,957,966, Cl. 525-66.000.

Abe, Kazuhide: *See*—
Saitoh, Shiroh; Izumi, Mamoru; Suzuki, Syuzi; and Abe, Kazuhide, 4,958,327, Cl. 367-7.000.

Abe, Shunichi, to Canon Kabushiki Kaisha. Original reading apparatus applying a lamp voltage to correct lamp blackening. 4,958,240, Cl. 358-475.000.

Abe, Yasunao: *See*—
Kondo, Masao; and Abe, Yasunao, 4,957,031, Cl. 84-613.000.

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Isono, Masanao; Kawamura, Ken; Asano, Masaya; Suzuki, Tetuo; and Abiko, Shigeo, 4,957,845, Cl. 430-156.000.

Abou-Gharbia, Magid A.; and Notvest, Ronald R., to American Home Products Corporation. Benzobicycloalkane derivatives as anticonvulsant neuroprotective agents. 4,957,909, Cl. 514-75.000.

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Abramovici, Gabriela M.; Buhrke, Rolfe E.; Chandramouli, Bopsi; Dianda, Robert B.; Katzenstein, Leo R.; O'Connor, Thomas M.; Rinker, Timothy G.; and Tripp, Susan J., to AT&T Bell Laboratories. Communication channel reservation. 4,958,343, Cl. 370-85.100.

ACC Automation, Inc.: *See*—
Daughenbaugh, Gary, 4,957,059, Cl. 118-423.000.

Accu Industries, Inc.: *See*—
Kendall, Paul W.; and Parrott, Gregory H., 4,958,290, Cl. 364-463.000.

Adam, Jean-Marie; and Baumann, Hans, to Ciba-Geigy Corporation. Heat-sensitive cyclic diazo compound containing recording material with benzotriazine compound and coupling component. 4,957,847, Cl. 430-170.000.

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Buck, Roy V.; and Adams, Darrell P., 4,957,583, Cl. 156-345.000.

Adams, Marvin, to Meltzer Industries Corporation. Garment having seamless body. 4,956,879, Cl. 2-80.000.

ADE Corporation: *See*—
Poduje, Noel S.; and Mallory, Roy E., 4,958,129, Cl. 324-661.000.

Adeka Argus Chemical Co., Ltd.: *See*—
Iizuka, Shunichi; Sakamaki, Yoshiyuki; and Shimoyama, Noriyuki, 4,957,954, Cl. 524-102.000.
Kikkawa, Kazumi; and Takahashi, Hiroshi, 4,957,953, Cl. 524-99.000.

Aden, Gary D., to Kevex Corporation. Masked electron beam lithography. 4,957,835, Cl. 430-5.000.

Adkins, Joey B.: *See*—
Carlo, Louis D.; and Adkins, Joey B., 4,958,084, Cl. 307-10.200.

Adkins, Kelvin P., to Imperial Chemical Industries PLC. Polymeric substrate coated with an electroconductive layer. 4,957,816, Cl. 428-411.100.

Adler, Michael S.: *See*—
Krishna, Surinder; Torreno, Manuel L., Jr.; and Adler, Michael S., 4,958,210, Cl. 357-34.000.

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Williams, Warren R., 4,956,990, Cl. 72-349.000.

Adur, Ashok M.; and Constable, Robert C., to Monsanto Company. Adhesive thermoplastic elastomer blends. 4,957,968, Cl. 525-74.000.

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Scott-Jackson, Dennis; and Skibbe, Harry, 4,958,071, Cl. 250-229.000.

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Chang, Chi, 4,958,321, Cl. 365-185.000.
Plants, William C., 4,958,132, Cl. 330-110.000.
Scott, Paul H., 4,958,344, Cl. 370-112.000.

Advanced Nuclear Fuels Corporation: *See*—
Ritter, Gerald L., 4,957,698, Cl. 376-444.000.

Advantest Corporation: *See*—
Fujisaki, Kenichi, 4,958,345, Cl. 371-21.300.
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Zaremba, Norman S.; and Beyer, John P., 4,956,911, Cl. 29-721.000.

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Bukatov, Alexandr S.; Iofis, Naum A.; Egorov, Jury G.; Dobrova, Natalya B.; Kostretsov, Anatoly S.; and Agafonov, Andrei V., 4,957,503, Cl. 623-2.000.

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Sakuma, Kuniharu; Honda, Hiroshi; Machata, Koukichi; and Aikawa, Takayuki, 4,957,054, Cl. 112-262.200.
Tamari, Nobuyuki; Kondoh, Isao; and Kinoshita, Nakoto, 4,957,509, Cl. 623-16.000.

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Agou, Tokinori; Sakashita, Takeshi; Shimoda, Tomoaki; Sudo, Masaru; Kuwabara, Masahiro; and Tanaka, Masahide, to Mitsui Petrochemical Industries, Ltd. Fluorine-substituted hydrocarbon group grafted (meth)acrylate polymers. 4,957,985, Cl. 526-246.000.

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Morsdorf, Peter; Schickaneder, Helmut; Herter, Rolf; Pfahlert, Volker; Engler, Heidrun; and Ahrens, Kurt H., 4,957,920, Cl. 514-252.000.

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Honkura, Yoshinobu; Fujii, Hideki; and Murata, Koji, 4,957,699, Cl. 420-41.000.
Honkura, Yoshinobu; Matsuo, Toru; and Murata, Kouji, 4,957,700, Cl. 420-59.000.

Aikawa, Takayuki: *See*—
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Air Products and Chemicals, Inc.: *See*—
Golden, Timothy C.; Kumar, Ravi; and Kratz, Wilbur C., 4,957,514, Cl. 55-26.000.
Hegarty, William P., 4,957,515, Cl. 55-43.000.

Aisin A W Co., Ltd.: *See*—
Kano, Takenori; Takemoto, Haruki; Niimi, Mamoru; Takase, Isao; and Yokoyama, Fumitomo, 4,957,195, Cl. 192-106.00F.

Aisin Seiki Kabushiki Kaisha: *See*—
Komazawa, Osamu; Isogai, Shigetaka; Buma, Shuuichi; Onuma, Toshio; Yonekawa, Takashi; and Hattori, Katsuhiko, 4,957,309, Cl. 280-707.000.

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Akazawa, Takashi: *See*—
Kiuchi, Atsushi; Kaneko, Kenji; Ishida, Jun; Nakagawa, Tetsuya; Hagiwara, Yoshimune; Akazawa, Takashi; and Sato, Tomoru, 4,958,276, Cl. 364-200.000.

Akbar, Shah; Kroesen, Patricia L.; Ogura, Seiki; and Rovedo, Nivo, to International Business Machines Corporation. Vertical bipolar transistor. 4,957,875, Cl. 437-31.000.

Akinfiev, Teodor S. Method of controlling mechanical resonance hand. 4,958,113, Cl. 318-568.180.

Akins, Edward A. Feeder for animals. 4,957,067, Cl. 119-60.000.

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Tominaga, Mamoru; Mori, Leo; and Akiyama, Junetsu, 4,957,370, Cl. 356-381.000.

Akman, Bulent; and de Curraize, Bernard. Method for making profiled plastic tubes such as corrugated tubes. 4,957,687, Cl. 264-506.000.

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Jonsson, Ulf E.; Sandberg, John A.; and Sjogren, John A., 4,957,745, Cl. 424-461.000.

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de Nijs, Hendrik, 4,957,119, Cl. 128-832.000.
Schutyser, Jan Andre J.; and Boonstra, Tjerk O., 4,957,981, Cl. 525-529.000.

Albini, Italo; Gruber, Werner; Wiemers, Norbert; Wichelhaus, Juergen; Leoni, Roberto; and Rossini, Angela, to Henkel Kommanditgesellschaft auf Aktien. Method of making and using thermoplastic block copolymers. 4,957,979, Cl. 525-420.500.

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Schoellkopf, Klaus; Albrecht, Rudolf; Lehmann, Manfred; and Schroeder, Gertrud, 4,958,026, Cl. 548-259.000.

Alcatel N.V.: *See*—
Fusg'Kurt, ml/a/ nger; and Krimmel, Heinz G., 4,957,339, Cl. 350-96.150.

Alessi, Paula J.; Faul, William H.; Giorgianni, Edward J.; Koop, Donald A.; and Madden, Thomas E., to Eastman Kodak Company. Color imaging apparatus producing visually matched displays of perceptually distinct reproduced images. 4,958,220, Cl. 358-76.000.

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Neff, Clayton; and Chowdhury, Mofazzal H., 4,957,065, Cl. 119-14.370.

Alfieri, Massimo; Lodi, Zelindo; and Trevisan, Gianfranco, to Fidenza Vetraria S.p.A. Elongated electrically insulating support structure and relevant preparation method. 4,958,049, Cl. 174-209.000.

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Weiler, Rolf; Panek, Claus-Peter; and Schmidt, Bodo, 4,957,192, Cl. 188-71.900.

Alich, Thomas; Flisikowski, Peter; and Peemoller, Horst, to U.S. Philips Corporation. Patient support for diagnostic apparatus. 4,956,885, Cl. 5-431.000.

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Kravetsky, Dmitry Y.; Zatulovsky, Lev M.; Egorov, Leonid P.; Pelts, Boris B.; Okun, Leonid S.; Freiman, Efim A.; Averyanov, Viktor V.; and Alishoev, Alexandr L., 4,957,713, Cl. 422-249.000.

Alker, David; and Cross, Peter E., to Pfizer Inc. Dihydropyridine derivatives. 4,957,930, Cl. 514-356.000.

Alko Ltd.: *See*—
Lehmussaari, Annti; and van der Ham, Wim, 4,957,565, Cl. 127-68.000.

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Allard, Peter B.: *See*—
Bleck, Gregory D.; and Allard, Peter B., 4,956,978, Cl. 62-239.000.

Allen-Bradley Company, Inc.: *See*—
Kerkman, Russel J.; and Seibel, Brian J., 4,958,117, Cl. 318-805.000.

Allen, R. Craig: *See*—
Kraft, Kenneth N.; and Allen, R. Craig, 4,957,129, Cl. 134-151.000.

Allergan, Inc.: *See*—
Lee, Gary C. M., 4,957,917, Cl. 514-231.500.

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Wan, Gary, 4,958,227, Cl. 358-148.000.

Allied Tube & Conduit Corporation: *See*—
Basile, Raffaele; and Shotts, David A., 4,957,314, Cl. 285-355.000.

Alloy Surfaces Company, Inc.: *See*—
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Alphacom Enterprise Co., Ltd.: *See*—
Lin, Run-Nin, 4,957,665, Cl. 261-95.000.

Alphonse, Gerard A.; and Palfrey, Stephen L., to RCA Inc. High performance angled stripe superluminescent diode. 4,958,355, Cl. 372-45.000.

Alpine Electronics Inc.: *See*—
Nakatomi, Yoshiyuki; Iwasa, Toshirou; and Kobayashi, Hitoshi, 4,958,067, Cl. 250-221.000.

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Aluminium Pechiney: *See*—
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Aluminum Company of America: *See*—
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Amendt, Herman M. A.: *See*—
Zwiers, Renso J. M.; Verhoeven, Johannes M. G.; and Amendt, Herman M. A., 4,957,663, Cl. 264-1.400.

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Buck, Roy V.; and Adams, Darrell P., 4,957,583, Cl. 156-345.000.

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Schroeder, James E.; and Anderson, Harlan U., 4,957,673, Cl. 264-60.000.

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Kaneko, Kuniya; Wakiyama, Harumichi; Naito, Tadashi; and Ando, Toshihiro, 4,958,292, Cl. 364-468.000.

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Beyer, Hans-Joachim, 4,956,918, Cl. 30-387.000.

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Kamarei, Ahmad R.; Catsimpoolas, Nicholas; McCluer, Robert; Mise, Takashi; and Sinn, Robert S., 4,957,741, Cl. 424-551.000.

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Nakagome, Yoshinobu; Itoh, Kiyoo; Aoki, Masakazu; Ikenaga, Shin'ichi; Horiguchi, Masashi; and Tanaka, Hitoshi, 4,958,325, Cl. 365-206.000.

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Chevalier, James L.; Pfeffer, John D.; and Brownell, Thomas F., 4,957,097, Cl. 126-373.000.

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Koishi, Musubu; Aoshima, Shinichiro; and Tsuchiya, Yutaka, 4,958,124, Cl. 324-96.000.
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Sims, Richard L.; Baker, Billy S.; Dotson, Randy G.; York, Robert J.; and Herrell, Joey A., 4,958,235, Cl. 358-402.000.

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Moore, Robin B., 4,958,304, Cl. 364-521.000.

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Saitoh, Keishi; Hashizume, Junichiro; Iida, Shigehira; Takei, Tetsuya; and Arai, Takayoshi, 4,957,772, Cl. 427-39.000.

Araki, Kenji: *See*—
Shima, Yoshinobu; Ohmura, Masanori; Ohtani, Akira; and Araki, Kenji, 4,957,712, Cl. 422-249.000.

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Williams, Stephen J.; and Traster, Elden D., 4,958,342, Cl. 370-79.000.

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Icenogle, Timothy; Machamer, William F.; Nelson, Robert J.; Mikitish, Stephen, Jr.; and Davis, Robert R., 4,957,121, Cl. 128-897.000.

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Asada, Seiichi: *See*—
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Kobayashi, Toshio, 4,957,287, Cl. 273-1.099.

Asahi Glass Company, Ltd.: *See*—
Matsumoto, Yukio; and Kunii, Nobuaki, 4,957,959, Cl. 524-196.000.
Sakuma, Yoichi; and Umezawa, Chieko, 4,957,345, Cl. 350-96.230.

Asahi Kasei Kogyo Kabushiki Kaisha: *See*—
Shirokaze, Junichi, 4,958,014, Cl. 536-56.000.

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Ichitsuka, Takeshi; Hirayama, Yasuhiko; and Ogawa, Tetsuro, 4,957,674, Cl. 264-65.000.

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Isono, Masanao; Kawamura, Ken; Asano, Masaya; Suzuki, Tetuo; and Abiko, Shigeo, 4,957,845, Cl. 430-156.000.

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Ohmae, Tadayuki; Sakurai, Tadashi; Yamaguchi, Noboru; Okada, Mitsuyuki; and Asao, Kouichiro, 4,957,660, Cl. 252-500.000.

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Ishikawa, Keiichi; and Asatsuke, Shoji, 4,957,015, Cl. 74-335.000.

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Jacobson, Klas; and Johansson, Hakan, 4,957,901, Cl. 505-1.000.

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Lawrence, Peter; Nazmy, Mohamed; and Staubli, Markus, 4,957,703, Cl. 420-448.000.

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Kawahara, Haruyuki; Tsukamoto, Seiichi; Nomura, Yutaka; Tanaka, Katsumi; Ashiura, Yasuyuki; and Yoshimura, Motonobu, 4,957,819, Cl. 428-547.000.

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Lundback, Stig S., 4,957,477, Cl. 600-16.000.

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Kral, Stephen F.; Barclay, John A.; Claybaker, Peter; and Jaeger, Steven R., 4,956,976, Cl. 62-51.300.

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Abramovici, Gabriela M.; Buhrke, Rolfe E.; Chandramouli, Bopsi; Dianda, Robert B.; Katzenstein, Leo R.; O'Connor, Thomas M.; Rinker, Timothy G.; and Tripp, Susan J., 4,958,343, Cl. 370-85.100.
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Haskell, Barin G.; and Puri, Atul, 4,958,226, Cl. 358-136.000.
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Miller, Gabriel L., 4,958,115, Cl. 318-662.000.

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Etourmy, Noel; and Laurent, Jean, 4,957,162, Cl. 166-212.000.

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Atkinson, Bruce D.: *See*—
Kidd, Dan; Napiorkowski, John J.; and Atkinson, Bruce D., 4,958,254, Cl. 361-119.000.

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Beer, Gary L.; and Li, Ying H., 4,957,048, Cl. 110-235.000.

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Huber, James V.; Scott, Kurt P.; and Leber, Rudolph J., 4,957,011, Cl. 73-865.600.

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Chandrasekaran, Swayambu; Kundel, Nikhil K.; Garg, Brij; and Chin, Hong B., 4,957,961, Cl. 524-405.000.

Automedix Sciences, Inc.: *See*—
Murtfeldt, Robert, 4,957,484, Cl. 604-53.000.

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Kravetsky, Dmitry Y.; Zatulovsky, Lev M.; Egorov, Leonid P.; Pelts, Boris B.; Okun, Leonid S.; Freimas, Efim A.; Averyanov, Viktor V.; and Alishoev, Alexandr L., 4,957,713, Cl. 422-249.000.

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Jorgensen, Jeffrey A., 4,958,108, Cl. 315-307.000.

Awano, Mamoru: *See*—
Kawamura, Michio; Shimada, Yasunori; Inoshita, Koichi; Yoshida, Shozo; Kawanabe, Toshiaki; Hattori, Haruo; Doi, Yukio; and Awano, Mamoru, 4,957,666, Cl. 264-4.700.

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Kutz, Giora, 4,956,920, Cl. 33-268.000.

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Hawryliko, Roman B.; and Widdifield, Richard A., 4,957,983, Cl. 526-200.000.

Baake, Karl A., to K & H Industries, Inc. Portable lamp. 4,958,267, Cl. 362-399.000.

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Jordan, David W.; and Thompson, William L., 4,958,070, Cl. 250-227.210.

Babjak, Juraj; Ettel, Victor A.; and Paserin, Vladimir, to Inco Limited. Method of forming nickel foam. 4,957,543, Cl. 148-13.000.

Bade, Maria L. Ester-stabilized chitin. 4,958,011, Cl. 536-20.000.

Badiali, Roberto: *See*—
Colli, Luigi; Badiali, Roberto; and Marangone, Nereo, 4,957,244, Cl. 242-35.6OR.

Baginski, Pierre; Nebon, Jean-Pierre; and Itur, Marc, to Merlin Gerin. High rating molded case multipole circuit breaker. 4,958,135, Cl. 335-8.000.

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Bailet, Jean-Claude, to Siamp Cedap S.A. Actuating device for moving a valve for emptying a flush tank. 4,956,880, Cl. 4-413.000.

Bair, Thomas I., to Du Pont de Nemours, E. I., and Company. Aramid fluff. 4,957,794, Cl. 428-74.000.

Baker, Billy S.: *See*—
Sims, Richard L.; Baker, Billy S.; Dotson, Randy G.; York, Robert J.; and Herrell, Joey A., 4,958,235, Cl. 358-402.000.

Balch, Kris S., to United States of America, Navy. Solid state electronic emulator of a multiple track motor driven rotating magnetic memory. 4,958,315, Cl. 364-900.000.

Baldi, Alfonso L., to Alloy Surfaces Company, Inc. Metal treatment. 4,957,421, Cl. 419-8.000.

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McMaster, Harold A.; and Balestra, Ben M., 4,957,531, Cl. 65-273.000.

Balka, Daniel R. Cargo carrier for vans. 4,957,228, Cl. 224-42.03A.

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Swartzel, Kenneth R.; Ball, Hershell R., Jr.; and Hamid-Samimi, Mohammad-Hosein, 4,957,759, Cl. 426-399.000.
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Ford, George W., Jr., 4,957,218, Cl. 222-1.000.

Balog, Stephen: *See*—
Hiestand, Everett N.; Balog, Stephen; and Gleason, David D., 4,957,003, Cl. 73-818.000.

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Garrish, Bryan F., 4,957,276, Cl. 261-112.100.

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Pong, William; Stacy, Robert G.; and Bancroft, Allen J., 4,958,068, Cl. 250-222.100.

Bancroft, Joseph C. Universal door panel system. 4,956,952, Cl. 52-207.000.

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Broghammer, Heinz; and Band, Gerhard, 4,957,013, Cl. 74-89.150.

Banko, Ronald C.; Cohn, Robert J.; and Welsch, John H., to InterMetro Industries Corporation. Device for storing a plurality of dishes or the like in a plurality of stacks. 4,957,206, Cl. 211-40.000.

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Banyu Pharmaceutical Company, Ltd.: *See*—
Miyano, Tetsuji; Suzuki, Kunio; Ushijima, Ryosuke; and Nakagawa, Susumu, 4,958,024, Cl. 546-249.000.
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Ferrand, Gerard; Barbanton, Jacques; Depin, Jean-Claude; and Chavernac, Gilles, 4,957,927, Cl. 514-428.000.

Barbaric, Zoran L.: *See*—
Nelson, Robert S.; Barbaric, Zoran L.; and Zach, Reuven D., 4,958,363, Cl. 378-85.000.

Barbee, Robert B.; and Phillips, Brian S., to Eastman Kodak Company. Powder coating compositions. 4,957,814, Cl. 428-402.000.

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Silvestrini, Jesus A.; and Barbier, Jose E., 4,957,043, Cl. 99-472.000.

Barbour, Peter W.: *See*—
Williams, Malcolm; Mackie, Carmichael; and Barbour, Peter W., 4,958,127, Cl. 324-426.000.

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Barclay, John A.: *See*—
Kral, Stephen F.; Barclay, John A.; Claybaker, Peter; and Jaeger, Steven R., 4,956,976, Cl. 62-51.300.

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Bauer, Karl; and Lorenz, Hellmut, 4,956,970, Cl. 57-334.000.

Barner, Richard; and Hubscher, Josef, to Hoffmann-La Roche Inc. Process for synthesizing chromanes. 4,958,035, Cl. 549-408.000.

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Barter, Edward C., to Square D Company. Monument fitting. 4,958,047, Cl. 174-48.000.

Barthelemy, Philippe; and Naturel, Christian, to Vallourec Industries; and Savoie Refractaires. Process for treating liquid steels by injecting gas through the ladle bottom. 4,957,542, Cl. 75-10.390.

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Aumueller, Alexander; Neumann, Peter; and Trauth, Hubert, 4,958,022, Cl. 544-180.000.
Bronstert, Bernd, 4,957,852, Cl. 430-283.000.
Guentner, Andreas; Mayer, Udo; and Oberlinner, Andreas, 4,958,021, Cl. 544-129.000.
Hagen, Helmut; Kohler, Rolf-Dieter; and Dupuis, Jacques, 4,957,608, Cl. 204-157.710.
Klimesch, Roger; Bleckmann, Gerhard; and Schlemmer, Lothar, 4,957,681, Cl. 264-211.230.
Schuetz, Franz; Sauter, Hubert; Brand, Siegbert; Wenderoth, Bernd; Baus, Ulf; Reuther, Wolfgang; Lorenz, Gisela; and Ammermann, Eberhard, 4,957,937, Cl. 514-407.000.
Steininger, Helmut, 4,957,604, Cl. 204-192.160.
Taubitz, Christof; Muehlbach, Klaus; Brandt, Hermann; and Bochke, Klaus, 4,957,965, Cl. 525-66.000.
Winkler, Matthias; Ittemann, Peter; and Heinz, Gerhard, 4,957,962, Cl. 524-538.000.

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Bates, Norman H. Office panel system incorporating improved locking and alignment mechanism. 4,956,953, Cl. 52-239.000.

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Buelt, James L.; and Oma, Kenton H., 4,957,393, Cl. 405-128.000.

Battery Technologies Inc.: *See*—
Kordesch, Karl; Gsellmann, Josef; and Tomantschger, Klaus, 4,957,827, Cl. 429-60.000.

Battista, Orlando A. Metallic-sounding plastic horseshoes. 4,957,168, Cl. 168-4.000.

Bauer, Karl; and Lorenz, Hellmut, to Barmag AG. False twist roll. 4,956,970, Cl. 57-334.000.

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Adam, Jean-Marie; and Baumann, Hans, 4,957,847, Cl. 430-170.000.

Baus, Ulf: *See*—
Schuetz, Franz; Sauter, Hubert; Brand, Siegbert; Wenderoth, Bernd; Baus, Ulf; Reuther, Wolfgang; Lorenz, Gisela; and Ammermann, Eberhard, 4,957,937, Cl. 514-407.000.

Bavis, Edward F. Conveyor system with stabilized conveyor basket. 4,957,188, Cl. 186-41.000.

Bax, Arthur, to CEKA N.V. Dental coupling assembly and method for its use. 4,957,438, Cl. 433-180.000.

Bay Mills Limited: *See*—
Shoesmith, Roy, 4,957,390, Cl. 404-70.000.

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Grohe, Klaus; and Schriewer, Michael, 4,958,045, Cl. 560-20.000.
Jelich, Klaus, 4,958,025, Cl. 546-345.000.
Lammens, Robert F.; Mahler, Hans F.; and Serno, Peter, 4,957,922, Cl. 514-255.000.
Rademachers, Jakob; Rade, Dieter; Hofs, Hans-Ulrich; Teichmann, Gunther; and Trenczek, Gerhard, 4,957,562, Cl. 106-453.000.
Saur, Wolfgang; Schreiber, Herbert; Hilken, Gunter; and Peter, Rolf, 4,957,955, Cl. 524-114.000.
Wollweber, Detlef; Kramer, Wolfgang; Brandes, Wilhelm; Dutzmann, Stefan; and Hanssler, Gerd, 4,957,919, Cl. 514-237.200.

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Gerow, Frank J., 4,957,487, Cl. 604-133.000.

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Caspari, Richard B.; Trott, Arthur F.; and Bays, F. Barry, 4,957,498, Cl. 606-146.000.

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Beach, Walter A.: *See*—
Dutton, Todd A.; and Beach, Walter A., 4,958,274, Cl. 364-200.000.

Beard, Larry D. Curb and gutter shovel. 4,957,170, Cl. 172-372.000.

Beauchamp, Lilia M., to Burroughs Wellcome Co. Therapeutic valine esters of acyclovir and pharmaceutically acceptable salts thereof. 4,957,924, Cl. 514-262.000.

Becchetti, Fred D., to University of Michigan, The. Large aperture ion-optical lens system. 4,958,078, Cl. 250-396.00R.

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Lee, Linda G.; and Chen, Chia-Huei, 4,957,870, Cl. 436-63.000.
Smith, Ward C., 4,957,638, Cl. 210-782.000.

Beech, Ronald: *See*—
Dutton, James P.; and Beech, Ronald, 4,957,708, Cl. 422-106.000.

Beecham Group P.L.C.: *See*—
Cole, Martin; Boyd, Malcolm R.; and Sutton, David, 4,957,733, Cl. 424-85.400.
Hunt, Eric, 4,957,905, Cl. 514-29.000.

Beer, Gary L.; and Li, Ying H., to Atlantic Richfield Company. Apparatus for tresting crude oil sludges and the like. 4,957,048, Cl. 110-235.000.

Behr Industrial Equipment Inc.: *See*—
Cann, Roger, 4,957,060, Cl. 118-699.000.

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Medler, Eberhard; Phillipi, Siefried; Vetter, Kurt; Freudenreich, Ludwig; and Lippuner, Othmar, 4,957,782, Cl. 427-421.000.

Behrens, Klaus: *See*—
Hoogland, Thomas; Harder, Hans E.; and Behrens, Klaus, 4,957,497, Cl. 606-71.000.

Beilush, Moishe. Dispenser gun. 4,957,223, Cl. 222-340.000.

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Negishi, Hirokazu, 4,957,184, Cl. 181-153.000.
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Causey, D. Richard. Method for producing microwaveable snacks. 4,957,755, Cl. 426-242.000.

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Polan, George S., 4,957,169, Cl. 169-37.000.

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Cohn, Gerald, to Goodyear Tire & Rubber Company, The. Preparation of ultra high molecular weight polyester. 4,957,945, Cl. 521-182.000.
Cohn, Harold S., III. Bath tub liner. 4,956,882, Cl. 4-580.000.
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Banko, Ronald C.; Cohn, Robert J.; and Welsch, John H., 4,957,206, Cl. 211-40.000.
Cole, Martin; Boyd, Malcolm R.; and Sutton, David, to Beecham Group P.L.C. Pharmaceutical products. 4,957,733, Cl. 424-85.400.
Coles, Mark, to Anadrill, Inc. Method to improve directional survey accuracy. 4,956,921, Cl. 33-304.000.
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Misevich, Kenneth W.; and Mintel, Thomas E., 4,956,927, Cl. 36-32.00R.
Colli, Luigi; Badiali, Roberto; and Marangone, Nereo, to Savio S.p.A. Bobbin winding method, and devices for implementing said method. 4,957,244, Cl. 242-35.6OR.
Collini, Rinetto. Process and apparatus for the electro-deposition of copper sheets on the cathodic sides of bipolar electrodes made of lead. 4,957,611, Cl. 204-106.000.
Colonel, Richard C.; and Lindh, Devere V. Shock relieving pad. 4,957,788, Cl. 428-33.000.
Colortronic Reinhard GmbH & Co. KG: *See—*
Roth, Udo, 4,957,176, Cl. 177-59.000.
Columbia University, The Trustees of: *See—*
Chu, Barbara; Kramer, Fred R.; Lizardi, Paul; and Orgel, Leslie E., 4,957,858, Cl. 435-6.000.
Columbus, Richard L., to Eastman Kodak Company. Capillary transport zone coated with adhesive. 4,957,582, Cl. 156-332.000.
Combined Fluid Products Co.: *See—*
Kist, William J., 4,957,283, Cl. 271-90.000.
Commandeur, Raymond; and Gurtner, Bernard, to Societe Atochem. Polyarylalkane oligomer compositions containing xylene units, process for their manufacture, and products containing the same. 4,957,815, Cl. 428-402.200.
Commercial Structures, Inc.: *See—*
Johnson, David H., 4,957,323, Cl. 296-181.000.
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Clerc, Jean-Frederic; and Deutsch, Jean-Claude, 4,957,349, Cl. 350-333.000.
Laval, Francois; and Vignane, Pascal, 4,958,027, Cl. 548-264.800.
Lizee, Jean-Francois, 4,958,059, Cl. 219-121.340.
Marechal, Roger L.; and Mauny, Pierre, 4,957,696, Cl. 376-419.000.
Commonwealth of Australia, The: *See—*
Carter, Norman L., 4,958,372, Cl. 381-72.000.
Thorncraft, David A.; Kennedy, David R.; Rashleigh, Scott C.; and Dabbs, Timothy P., 4,957,338, Cl. 350-96.150.
Concept, Inc.: *See—*
Caspari, Richard B.; Trott, Arthur F.; and Bays, F. Barry, 4,957,498, Cl. 606-146.000.
Conoco Inc.: *See—*
Cantu, Lisa A.; Osborne, Marion W.; and McBride, Edward F., 4,957,165, Cl. 166-295.000.
Schwartz, Bernard A.; Tew, Tommy L.; and Janda, Marvin E., 4,958,170, Cl. 346-136.000.
Whitfill, Donald L.; Kubena, Edwin, Jr.; Cantu, Terry S.; and Sooter, Matthew C., 4,957,174, Cl. 175-72.000.
Conrow, Ransom B.: *See—*
Krishnan, Raghavan; Gamble, Jesse; Blum, David; Curran, William V.; Lee, Ving J.; and Conrow, Ransom B., 4,958,020, Cl. 540-310.000.
Consolidation Coal Company: *See—*
Roberts, Margaret A.; and Brown, Harry J., 4,957,405, Cl. 414-339.000.
Constable, Robert C.: *See—*
Adur, Ashok M.; and Constable, Robert C., 4,957,968, Cl. 525-74.000.
Control Data Corporation: *See—*
Damoci, Joseph A.; Kern, Matthew F.; Welsh, Russell J.; and Fourdraine, John D., 4,958,371, Cl. 379-377.000.
Ries, Richard D.; Smith, Dewey W.; and Payton, Spero, 4,958,214, Cl. 357-74.000.
Cooper Industries, Inc.: *See—*
MacIntyre, Brian; McAvoy, Sean; and Close, Frank, 4,957,313, Cl. 285-144.000.
Cooper, Leon N.: *See—*
Reilly, Douglas L.; Scofield, Christopher L.; Cooper, Leon N.; and Elbaum, Charles, 4,958,375, Cl. 382-14.000.
Cooperstein, Gerald: *See—*
Sohval, A. Robert; Cooperstein, Gerald; Goldstein, Shyke A.; and Hearn, David R., 4,958,365, Cl. 378-122.000.
Corain, Luciano; and Maitan, Gianni, to Nuovopignone - Industrie Meccaniche e Fonderia S.p.A. Demountable pin for rotatably con-

necting together two elements of small axial dimension, particularly suitable for the lever mechanisms of textile machines. 4,957,403, Cl. 411-368.000.

Corbellini, Glauco. Suction box cover with modular components. 4,957,598, Cl. 162-363.000.

Corbett, Christopher H., to Flex Technologies, Inc. Assembly and method for the adjustment of a cable casing. 4,957,017, Cl. 74-502.400.

Cordani, John L., to MacDermid, Incorporated. Composition containing alkane sulfonic acid and ferric nitrate for stripping tin or tin-lead alloy from copper surfaces, and method for stripping tin or tin-lead alloy. 4,957,653, Cl. 252-142.000.

Cornell Research Foundation, Inc.: *See*—
Law, David M.; Davies, Peter J.; and Mutschler, Martha A., 4,957,757, Cl. 426-281.000.

Cornell, William D., to Sherwood Medical Company. Serum separator system for centrifuge with piercable membrane. 4,957,637, Cl. 210-782.000.

Corrigan, Eugene E.: *See*—
Bardsley, Robert F.; and Corrigan, Eugene E., 4,957,753, Cl. 426-111.000.

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Cameron, Ronald D., 4,957,095, Cl. 124-89.000.

Coughlin, Gregory R.: *See*—
Falk, Robert A.; Clark, Kirtland P.; and Coughlin, Gregory R., 4,957,904, Cl. 514-24.000.

Coulter Electronics, Inc.: *See*—
Prosi, Oscar; Fayer, Ervin; and Dominick, George G., 4,957,008, Cl. 73-864.830.

Counsell, Raymond E.; Longino, Marc A.; Weichert, Jamey P.; and Schwendner, Susan P., to University of Michigan, The. Polyiodinated triglyceride analogs as radiologic agents. 4,957,729, Cl. 424-5.000.

Courchesne, Claude J. F.; and Palmer, Theodore R. Roof scaffold. 4,957,185, Cl. 182-150.000.

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Brevard, Christian; Coutures, Jean-Pierre; Massiot, Dominique; Rifflet, Jean-Claude; and Taulelle, Francis, 4,958,126, Cl. 324-318.000.

Cox, Howard W.: *See*—
Mentzer, Charles C.; Cox, Howard W.; and Short, William T., 4,957,802, Cl. 428-174.000.

Coyle, William E., Jr.; and Pennison, Dennis J., to Bilco Tools, Inc. Method, system and device for determining quality of assembly of tool parts. 4,957,002, Cl. 73-761.000.

Craig, James R. Fertilizer container for sprinkler system. 4,957,134, Cl. 137-268.000.

Crawley, Edward F.; and Hagood, Nesbitt, to Massachusetts Institute of Technology. Actuated truss system. 4,958,100, Cl. 310-328.000.

Creasy, Kenneth E.: *See*—
Shaw, Brenda R.; and Creasy, Kenneth E., 4,957,593, Cl. 204-291.000.

Cremascoli, Patrizio. Hip prosthesis structure adapted for easy fitting to the patient coxo-femural articulation. 4,957,510, Cl. 623-23.000.

Creuly, Catherine; Gros, Jean-Bernard; and Larroche, Christian, to Sanofi. Microbiological process for the preparation of methyl ketones. 4,957,862, Cl. 435-148.000.

Cripps, Harry N., to Du Pont de Nemours, E. I., and Company. Partially fluorinated polyesters from ketene acetals and fluorine monomers. 4,957,986, Cl. 526-247.000.

Critikon, Inc.: *See*—
Cameron, Robert H.; and Doman, Robert, 4,957,488, Cl. 604-161.000.
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Cron, Alain: *See*—
Fischer, Francis; Calmes, Jean-Paul; and Cron, Alain, 4,956,988, Cl. 72-208.000.

Cronin, John V. Double sided screener for printed circuit boards. 4,957,044, Cl. 101-35.000.

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Clayton, Andrew R.; and Cronin, Robert A., 4,957,574, Cl. 156-126.000.

Cross, Kathryn: *See*—
Wieserman, Larry F.; Wefers, Karl; Cross, Kathryn; Martin, Edward S.; Hsieh, H. Philip; and Quayle, William H., 4,957,890, Cl. 502-4.000.

Cross, Peter E.: *See*—
Alker, David; and Cross, Peter E., 4,957,930, Cl. 514-356.000.

Crotti, Pier L., to SGS-Thomson Microelectronics s.r.l. Formation of self-aligned contacts. 4,957,881, Cl. 437-195.000.

Crowley, Patrick J.: *See*—
Worthington, Paul A.; Crowley, Patrick J.; and Gravestock, Michael B., 4,957,539, Cl. 71-92.000.

Crown Decorative Products Limited: *See*—
Geddes, Kenneth R., 4,957,982, Cl. 526-62.000.

Cuddihy, Edward F.; and Willis, Paul B., to United States of America, National Aeronautics and Space Administration. Predictive aging of polymers. 4,957,012, Cl. 73-866.000.

Cullen, John S.; and Matrak, Edgard, to Multiform Desiccants, Inc. Packet strip. 4,957,521, Cl. 55-387.000.

Culpepper, Mark, to Ricoh Company, Ltd.; and Ricoh Corporation. Inkjet drop generator. 4,958,168, Cl. 346-75.000.

Cultice, Richard D., Jr.: *See*—
Carlson, Dennis L.; and Cultice, Richard D., Jr., 4,957,600, Cl. 160-199.000.

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Rummage, Tony F.; Wise, John T.; Foehrenbach, Charles D.; and Cunningham, McCleery B., 4,957,270, Cl. 249-48.000.

Cuomo, Andrea; Diazzi, Claudio; and Rischmuller, Klaus, to SGS-Thomson Microelectronics s.r.l. Protection of power converters from voltage spikes. 4,958,121, Cl. 323-224.000.

Cupp, Carl J., to Pachmayr Ltd. Gun recoil pad. 4,956,932, Cl. 42-74.000.

Curbelo, Raul, to Bio-Rad Laboratories, Inc. Technique for improving the resolution of an A/D converter. 4,958,308, Cl. 364-574.000.

Curran, William V.: *See*—
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Cussler, Edward L., to Hoechst Celanese Corporation. Liquid chromatography using microporous hollow fibers. 4,957,620, Cl. 210-635.000.

Cyclean: *See*—
Radomsky, John, 4,957,434, Cl. 432-103.000.

Dabbaj, Rad H. Display devices and display elements thereof. 4,958,150, Cl. 340-783.000.

Dabbs, Timothy P.: *See*—
Thorncraft, David A.; Kennedy, David R.; Rashleigh, Scott C.; and Dabbs, Timothy P., 4,957,338, Cl. 350-96.150.

Dahl, Joshua R. Fishing lure. 4,956,934, Cl. 43-42.310.

Daifuku, Hideharu; Kitamura, Takashi; and Kawagoe, Takahiro, to Bridgestone Corporation. Non-aqueous liquid electrolyte cell. 4,957,833, Cl. 429-197.000.

Daikin Industries, Ltd.: *See*—
Saegusa, takeo; Miyamoto, Masatoshi; and Sano, Yoshiyuki, 4,958,005, Cl. 528-408.000.
Tamura, Koiyji; Kashiwagi, Hiroshi; and Noguchi, Masahiro, 4,957,652, Cl. 252-67.000.
Ueda, Tomoaki, 4,958,300, Cl. 364-521.000.

Daikoku, Takashi: *See*—
Masuyama, Fujimitsu; Daikoku, Takashi; Haneda, Hisao; Yoshikama, Kunihiko; Teranishi, Hiroshi; and Iseda, Atsuro, 4,957,701, Cl. 420-69.000.

Daimler-Benz AG: *See*—
Fortnagel, Manfred; and Platzer, Dieter, 4,956,973, Cl. 60-605.200.
Medler, Eberhard; Phillipi, Siefried; Vetter, Kurt; Freudenreich, Ludwig; and Lippuner, Othmar, 4,957,782, Cl. 427-421.000.
Wagner, Wolf-Dietrich; Springer, Willi; Meissner, Ludwig; Bonfert, Helmut; Bottcher, Michael; Hardt, Thomas; Klumpp, Rolf; Krause, Klaus; Peters, Arndt; Plattner, Ernst; Strobel, Wolfgang; Waller, Wolfgang; and Wiemann, Gunter, 4,957,068, Cl. 123-41.82R.

Dakov, Mincho S.: *See*—
Dimitrov, Dimiter A.; Dakov, Mincho S.; Tonchev, Dancho T.; Kalafirov, Hristo A.; Botev, Todor S.; Sherev, Krassimir E.; Kojuharov, Vladimir S.; Dimitrov, Yordan I.; and Tzvetkov, Dimiter V., 4,957,529, Cl. 65-112.000.

Daleo, Carlo V.: *See*—
Hsu, Sawyer C-Y.; Daleo, Carlo V.; Valentine, Sidney L.; Fratis, James; and Fischer, Robert W., Jr., 4,957,333, Cl. 312-108.000.

Daley, Thomas M.: *See*—
Jakubiec, Antoni F.; and Daley, Thomas M., 4,957,018, Cl. 74-531.000.

Dambre, Pierre, to Elevage Avicole de la Bohardiere. Fan assembly for an egg incubator enclosure or a hatching enclosure. 4,957,066, Cl. 119-39.000.

Damoci, Joseph A.; Kern, Matthew F.; Welsh, Russell J.; and Fourdraine, John D., to Control Data Corporation. Method and apparatus for determining when a telephone handset is off-hook. 4,958,371, Cl. 379-377.000.

D'Angelo, Charles: *See*—
Sarin, Vinod K.; D'Angelo, Charles; and Rebenne, Helen E., 4,957,780, Cl. 427-255.200.

Daniels, Edward P.: *See*—
Mamone, John R.; Hutcheson, Neale C.; Mallozzi, Joseph D.; Daniels, Edward P.; and Cheng, Chikou, 4,958,291, Cl. 364-464.020.

Daniels, Keith L., to Reading Technologies, Inc. Inverse flow depth filter assembly. 4,957,516, Cl. 55-218.000.

Dannatt, Hugh S., to Pitney Bowes Inc. Tape module for a modular mailing machine. 4,957,179, Cl. 177-145.000.

dasa, Madhava. Model airplane or toy glider. 4,957,465, Cl. 446-61.000.

Datatape Incorporated: *See*—
Trcka, Milan V., 4,958,248, Cl. 360-107.000.

Daughenbaugh, Gary, to ACC Automation, Inc. Pattern carrier for continuous dipping. 4,957,059, Cl. 118-423.000.

Davenport, James D.: *See*—
Arnold, Wendell R.; and Davenport, James D., 4,957,533, Cl. 71-3.000.

Davenport, John M.; Finch, William W.; Hansler, Richard L.; Nagle, Richard C.; and White, Ronald S., to General Electric Company. Centralized lighting system employing a high brightness light source. 4,958,263, Cl. 362-32.000.

Davidson, David L.; Parrent, George B., Jr.; Gubisch, Roland W.; and Hauer, Harold, to Hercules Incorporated. Analyzing apparatus and method for analysis of liquid samples. 4,958,295, Cl. 364-497.000.

Davidson, Leonard D. Tool for holding a rotatable lawn mower blade. 4,956,905, Cl. 29-281.100.

Davidson Textron Inc.: *See*—
Lue, Ching-Tai, 4,956,994, Cl. 73-81.000.

Davies, Peter J.: *See*—
Law, David M.; Davies, Peter J.; and Mutschler, Martha A., 4,957,757, Cl. 426-281.000.

Davis, Alfred L., to Sheller-Globe Corporation. Fiber web for compression molding structural substrates for panels. 4,957,809, Cl. 428-283.000.

Davis, Emsley A. Rectal-stomal insert apparatus and method. 4,957,486, Cl. 604-96.000.

Davis, Kenneth P.: *See*—
Young, David E.; and Davis, Kenneth P., 4,957,103, Cl. 128-78.000.

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Icenogle, Timothy; Machamer, William F.; Nelson, Robert J.; Mikitish, Stephen, Jr.; and Davis, Robert R., 4,957,121, Cl. 128-897.000.

Davis Water and Waste Industries, Inc.: *See*—
Pauwels, Julian R., 4,957,631, Cl. 210-264.000.

Davis, William M., to United Pharmaceuticals, Inc. Anti-spasmdoic agents having an acetylenic bond. 4,957,941, Cl. 514-648.000.

Dawson, Dennis W.: *See*—
Jarnagin, Jerry; and Dawson, Dennis W., 4,957,394, Cl. 405-128.000.

DeBrito, Daniel N.: *See*—
Hill, Susan C.; Jelemensky, Joseph; Heene, Mark R.; Groves, Stanley E.; and DeBrito, Daniel N., 4,958,277, Cl. 364-200.000.

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Guerin, Christine; Penato, Jean-Marie; and Debrouwer, Yves, 4,958,364, Cl. 378-144.000.

De Buscher, Cyriel R. J.; Muijs, Cornelis G. M.; and Verweirder, Gery G. R., to Ford New Holland, Inc. Agricultural baler with feeder door. 4,956,967, Cl. 56-341.000.

de Curraize, Bernard: *See*—
Akman, Bulent; and de Curraize, Bernard, 4,957,687, Cl. 264-506.000.

Deere & Company: *See*—
Anstey, Henry D.; and Rumph, George W., 4,956,960, Cl. 53-118.000.
Rumph, George W.; and Anstey, Henry D., 4,956,959, Cl. 53-118.000.

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Yamanaka, Toshihiro; Horie, Nobuyuki; Kobayashi, Shozou; Deguchi, Toshihisa; Yamaguchi, Takeshi; Maeda, Shigemi; Nishioka, Yoshiki; and Sugiura, Teruki, 4,958,337, Cl. 369-58.000.

Delaney, Robert; and Merriman, Richard A., Jr., to NCR Corporation. Platen-yoke apparatus for a printer using a floating platen. 4,957,382, Cl. 400-656.000.

Delapierre, Jean. Machine for arranging articles, such as cans of food. 4,957,197, Cl. 198-394.000.

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Delphax Systems: *See*—
McCallum, Robert S.; McIntosh, Brian; and Gandhi, Hemant, 4,958,172, Cl. 346-159.000.

Delpy, David T.; Hiruma, Hideo; and Suzuki, Susumu, to Hamamatsu Photonics Kabushiki Kaisha. Apparatus for obtaining information on the interior of an object. 4,957,000, Cl. 73-622.000.

DeMent, Neaville L. Safety device for power operated overhead door. 4,956,938, Cl. 49-28.000.

Den-Tal-Ez, Inc.: *See*—
Gonser, Donald I.; and Reinhart, Douglas M., 4,957,483, Cl. 604-30.000.

Den, Tohru: *See*—
Ando, Kenji; Kamiya, Osamu; Sugata, Masao; Kurihara, Noriko; Sugata, Hiroyuki; Den, Tohru; Kimura, Toshiaki; Hamamoto, Takashi; Haruta, Masahiro; and Osabe, Kuniji, 4,957,061, Cl. 118-719.000.

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Denisov, Vladimir F.; Gertseva, Marina I.; Ziberov, Valentin E.; Karapetian, Vadim K.; Sarkisian, Norik S.; Karbachinsky, Vladimir M.; Kharlamov, Oleg I.; Tsoi, Alexei D.; Tsysin, Mark I.; Romanov, Alexei A.; Veranian, Vagan D.; Khripin, Vasily D.; and Shafran, Larisa E. Method of cleaning gas from solid and gaseous matter and apparatus materializing same. 4,957,512, Cl. 55-8.000.

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Hirashima, Nobuhiro; Matsunaga, Shiro; and Nakata, Mitsuyuki, 4,957,991, Cl. 526-295.000.

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Pitch, John J.; Parker, Tim; Bouchard, Alfred T., Jr.; and Sullivan, Mary, 4,958,173, Cl. 346-160.100.

Depin, Jean-Claude: *See*—
Ferrand, Gerard; Barbanton, Jacques; Depin, Jean-Claude; and Chavernac, Gilles, 4,957,927, Cl. 514-428.000.

Dereims, Philippe: *See*—
Letemps, Bernard; Leclercq, Jacques; and Dereims, Philippe, 4,957,528, Cl. 65-104.000.

Derksen, Michael; and Domke, Joachim, to Herfeld GmbH & Co. KG. Method and apparatus for mixing bulk materials in powdered or granular form. 4,957,373, Cl. 366-197.000.

Descamps, Marcel: *See*—
Gubin, Jean; Chatelain, Pierre; Descamps, Marcel; Nisato, Dino; Inion, Henri; Lucchetti, Jean; Mahaux, Jean-Marie; and Vallat, Jean-Noel, 4,957,925, Cl. 514-299.000.

DeSoto, Inc.: *See*—
Sekmakas, Kazys; and Parenti, Aurelio, 4,957,952, Cl. 523-402.000.

Deubel, Reinhold: *See*—
Macholdt, Hans-Tobias; Sieber, Alexander; Schui, Franz; and Deubel, Reinhold, 4,957,841, Cl. 430-110.000.

Deutsch, Edward A.; and Libson, Karen F., to University of Cincinnati. Kit for preparing Tc (III)-99m myocardial imaging agents that are effective in humans. 4,957,728, Cl. 424-1.100.

Deutsch, Jean-Claude: *See*—
Clerc, Jean-Frederic; and Deutsch, Jean-Claude, 4,957,349, Cl. 350-333.000.

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Lahr, Helfrid; and Pontani, Bernd, 4,957,692, Cl. 376-260.000.

Deutsche ITT Industries GmbH: *See*—
Uhlenhoff, Arnold, 4,958,313, Cl. 364-757.000.

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Guillon, Jean-Claude; and Rufray, Jean-Claude, 4,958,229, Cl. 358-180.000.

Devin, Jean, to SGS-Thomson Microelectronics SA. Method for the testing of electrically programmable memory cells, and corresponding integrated circuit. 4,958,324, Cl. 365-201.000.

Devoussoux, Serge: *See*—
Sazod, Michel; Devoussoux, Serge; Marchiset, Michel; and Jaumot, Jean-Pierre, 4,957,680, Cl. 264-161.000.

De Vries, Hans: *See*—
Wokke, Eduard A.; and De Vries, Hans, 4,957,199, Cl. 198-847.000.

De With, Peter H. N., to U.S. Philips Corporation. System for the transmission of video signals with adaptive code word allocation, and also a transmitter and a receiver suitable for the system. 4,957,688, Cl. 358-133.000.

Dewitte, Philippe; Canaud, Michel; and Poix, Rene , to Saint-Gobain Vitrage. Method and apparatus for the production of a bead of organic material intended to serve as a seal and insert in a multiple glazing. 4,957,572, Cl. 156-109.000.

Dews, James K.: *See*—
Turner, William F.; and Dews, James K., 4,957,200, Cl. 202-181.000.

Dianda, Robert B.: *See*—
Abramovici, Gabriela M.; Buhrke, Rolfe E.; Chandramouli, Bopsi; Dianda, Robert B.; Katzenstein, Leo R.; O'Connor, Thomas M.; Rinker, Timothy G.; and Tripp, Susan J., 4,958,343, Cl. 370-85.100.

Diard, Jean-Luc; Grandjacques, Philippe; and Recher, Gilles, to Salomon S.A. Ski comprising a longitudinal rib at its top part. 4,957,304, Cl. 280-609.000.

Diazzi, Claudio: *See*—
Cuomo, Andrea; Diazzi, Claudio; and Raschmuller, Klaus, 4,958,121, Cl. 323-224.000.

Dibie, Alain J.: *See*—
Lahille, Michel A.; and Dibie, Alain J., 4,957,501, Cl. 606-200.000.

Digital Equipment Corporation: *See*—
Assarpour, Hamid; and Walton, Lea, 4,958,303, Cl. 364-521.000.
Dutton, Todd A.; and Beach, Walter A., 4,958,274, Cl. 364-200.000.

Dimitri, Mitchell S., to Westvaco Corporation. Submicron lignin dispersions. 4,957,557, Cl. 106-123.100.

Dimitrov, Dimiter A.; Dakov, Mincho S.; Tonchev, Dancho T.; Kalafirov, Hristo A.; Botev, Todor S.; Shterev, Krassimir E.; Kojuharov, Vladimir S.; Dimitrov, Yordan I.; and Tzvetkov, Dimiter V., to PU "Paisii Hilendarski". Method of decorating glass and ceramic articles. 4,957,529, Cl. 65-112.000.

Dimitrov, Yordan I.: *See*—
Dimitrov, Dimiter A.; Dakov, Mincho S.; Tonchev, Dancho T.; Kalafirov, Hristo A.; Botev, Todor S.; Shterev, Krassimir E.; Kojuharov, Vladimir S.; Dimitrov, Yordan I.; and Tzvetkov, Dimiter V., 4,957,529, Cl. 65-112.000.

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Dionisio, Philip: *See*—
Dionisio, Louis A.; and Dionisio, Philip, 4,957,150, Cl. 152-454.000.

Dittmar, Walter: *See*—
Bohn, Manfred; Dittmar, Walter; Peil, Heinz G.; Futterer, Eberhard; and Kraemer, Karl, 4,957,730, Cl. 424-61.000.

Dobrova, Natalya B.: *See*—
Bukatov, Alexandr S.; Iofis, Naum A.; Egorov, Jury G.; Dobrova, Natalya B.; Kostretsov, Anatoly S.; and Agafonov, Andrei V., 4,957,503, Cl. 623-2.000.

Dobruskin, Moysei. Method of and device for preserving biological and medical action of substances based on electrical charge and/or state. 4,957,493, Cl. 604-403.000.

Doering, Robert R.: *See*—
Teng, Clarence W.; Doering, Robert R.; and Anderson, Dirk, 4,958,206, Cl. 357-23.600.
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Fischberg-Bender, Ellyn: *See—*
Bizub, Diane; Fischberg-Bender, Ellyn; and Skalka, Anna M., 4,957,859, Cl. 435-7.000.

Fischer, Francis; Calmes, Jean-Paul; and Cron, Alain, to Loeza Ltd. Mandrel rod for pipe rolling mills. 4,956,988, Cl. 72-208.000.

Fischer, Manfred; and Hofer, Bernd, to MBB GMBH. Method for protecting light conductive fiber ends projecting from a fiber reinforced part. 4,957,576, Cl. 156-166.000.

Fischer & Porter Company: *See—*
Yard, John; and Strohmeier, Warren O., 4,957,005, Cl. 73-861.380.

Fischer, Robert W. Jr.: *See—*
Hsu, Sawyer C-Y.; Daleo, Carlo V.; Valentine, Sidney L.; Fratis, James; and Fischer, Robert W., Jr., 4,957,333, Cl. 312-108.000.

Fisher, David J., to Electric Power Research Institute, Inc. Method for detecting impurities in an oil sample. 4,957,871, Cl. 436-165.000.

Fisher, Lynn E.; Wandler, Richard A.; and Frank, James P., to General Electric Company. Terminal board assembly. 4,958,051, Cl. 200-80.00R.

Fisher, Thomas A.: *See—*
Pickering, James A.; Johnston, Joseph R.; and Fisher, Thomas A., 4,957,094, Cl. 124-24.100.

Fitch, John J.; Parker, Tim; Bouchard, Alfred T., Jr.; and Sullivan, Mary, to Dennison Manufacturing Company. Toner receptive coating. 4,958,173, Cl. 346-160.100.

FitzGerald, David J.: *See—*
Bjorn, Michael J.; FitzGerald, David J.; Frankel, Arthur E.; Laird, Walter J.; Pastan, Ira H.; Ring, David B.; Willingham, Mark C.; and Windelhake, Jeffrey L., 4,958,009, Cl. 530-389.000.

Fitzner, Arthur O., to Brunswick Corporation. Voltage regulators for permanent magnet alternators. 4,958,119, Cl. 322-91.000.

Fitzpatrick, Mark F.; and Gouldsberry, Gary R., to Gazelle Microcircuits, Inc. High output drive FET buffer for providing high initial current to a subsequent stage. 4,958,089, Cl. 307-448.000.

Flamant, Frederic: *See—*
Samarut, Jacques; Verdier, Gerard; Benchaibi, Miloud; Savatier, Pierre; Poncet, Didier; Flamant, Frederic; Xiao, Jiso-Hao; Thoraval, Pierrick; Chambonnet, Frederique; and Nigon, Victor, 4,957,865, Cl. 435-235.000.

Flex-a-lite Consolidated: *See—*
Willingham, Rainer O., 4,957,414, Cl. 416-229.00R.

Flex Technologies, Inc.: *See—*
Corbett, Christopher H., 4,957,017, Cl. 74-502.400.

Flint & Walling, Inc.: *See—*
Kachuk, Paul T., 4,958,096, Cl. 310-68.00E.

Flisikowski, Peter: *See—*
Alich, Thomas; Flisikowski, Peter; and Peemoller, Horst, 4,956,885, Cl. 5-431.000.

Flora, Laurence P.; and Ruby, Gary V., to Unisys Corp. (Formerly Burroughs Corp.). High capacity multiple-disk storage method and apparatus having unusually high fault tolerance level and high bandpass. 4,958,351, Cl. 371-40.100.

Flottweg GmbH: *See—*
Kreill, Walter, 4,957,475, Cl. 494-53.000.

Floyd, Middleton B., Jr., to American Cyanamid Company. Precursors and synthesis of methyl-9-oxo-11apha, 16-dihydroxy-16-vinyl-5-cis-13-trans-prostadienoates. 4,958,037, Cl. 549-476.000.

Flying Dutchman, Inc.: *See—*
Lepley, James W., 4,957,404, Cl. 414-324.000.

Foehrenbach, Charles D.: *See—*
Rummage, Tony F.; Wise, John T.; Foehrenbach, Charles D.; and Cunningham, McCleery B., 4,957,270, Cl. 249-48.000.

Foley, Dennis D., to Excello Specialty Company, The. Water deflector with wire harness seal. 4,957,803, Cl. 428-182.000.

Fong, Pak Y.; Smith, Kim R.; and Sauer, Joe D., to Ethyl Corporation. Catalyst for making amines from alcohols. 4,957,893, Cl. 502-174.000.

Foote, James C., Jr.: *See—*
Castrignano, Frank; Foote, James C., Jr.; Marowski, Robert E.; and Young, Richard D., 4,957,584, Cl. 156-361.000.

Ford Aerospace Corporation: *See—*
Roberts, Thomas E.; and Hwang, Yeongming, 4,958,162, Cl. 343-700.0MS.
Tanner, Robert M.; Koralek, Richard; Chethik, Frank; Lengel, Stephen B.; and Miller, David H., 4,958,349, Cl. 371-37.100.

Ford, George W., Jr., to Ballard Medical Products. Foamer and method. 4,957,218, Cl. 222-1.000.

Ford Motor Company: *See—*
Martin, Norman G.; and Eubank, William J., 4,957,321, Cl. 296-65.100.

Ford New Holland, Inc.: *See—*
De Busscher, Cyriel R. J.; Muijs, Cornelis G. M.; and Verweirder, Gery G. R., 4,956,967, Cl. 56-341.000.
Underhill, Kenneth R., 4,956,968, Cl. 56-341.000.

Forester, Thomas E.: *See—*
Mathers, James P.; Wood, William P.; and Forester, Thomas E., 4,957,886, Cl. 501-96.000.

Fornadley, Michael R. Light transmissive stone structure and method for making same. 4,957,785, Cl. 428-15.000.

Fortnagel, Manfred; and Platzer, Dieter, to Daimler-Benz AG. Exhaust gas recycling system for an exhaust gas turbocharged engine. 4,956,973, Cl. 60-605.200.

Fortuin, Johannes M. H.; Goebel, Johannes C.; and Simons, Antonius J. F., to Stamicarbon B. V. Process for liquid-solid contact. 4,957,627, Cl. 210-679.000.

Fosse, Navarro T.: *See—*
Mitchell, William J.; and Fosse, Navarro T., 4,957,424, Cl. 425-145.000.

Foster, C. Mackay: *See—*
Patton, Bob J.; and Foster, C. Mackay, 4,957,172, Cl. 175-61.000.

Fourdraine, John D.: *See—*
Damoci, Joseph A.; Kern, Matthew F.; Welsh, Russell J.; and Fourdraine, John D., 4,958,371, Cl. 379-377.000.

Fourreau, Joel G.: *See—*
Romette, Jean-Louis; and Fourreau, Joel G., 4,957,706, Cl. 422-100.000.

Fox, J. Thomas, to Emox High Technology, Inc. Method for enhacing recovery of oil and compositions related thereto. 4,957,639, Cl. 252-8.554.

France Grignotage S.A.R.L.: *See—*
Parmentier, Michel; and Weber, Jean-Charles, 4,957,520, Cl. 55-269.000.

Francis, Dawn E. Novel organic fertilizer and production thereof. 4,957,534, Cl. 71-23.000.

Francis, Gerald T., to Francis, Gerald T. Brick panel wall construction. 4,956,949, Cl. 52-38.000.

Frank, James P.: *See—*
Fisher, Lynn E.; Wandler, Richard A.; and Frank, James P., 4,958,051, Cl. 200-80.00R.

Frankel, Arthur E.: *See—*
Bjorn, Michael J.; FitzGerald, David J.; Frankel, Arthur E.; Laird, Walter J.; Pastan, Ira H.; Ring, David B.; Willingham, Mark C.; and Windelhake, Jeffrey L., 4,958,009, Cl. 530-389.000.

Fratis, James: *See—*
Hsu, Sawyer C-Y.; Daleo, Carlo V.; Valentine, Sidney L.; Fratis, James; and Fischer, Robert W., Jr., 4,957,333, Cl. 312-108.000.

Frazee, Ralph E., Jr.; and Smithgall, David H., Sr., to AT&T Bell Laboratories. Optical fiber coating control process. 4,957,526, Cl. 65-3.110.

Fredrickson, Robert W.; and Shah, Monish S., to Hewlett-Packard Company. Graphics frame buffer with pixel serializing group rotator. 4,958,302, Cl. 364-521.000.

Freeman, Gerard L.: *See—*
Branovich, Louis E.; Smith, Bernard; Freeman, Gerard L.; and Eckart, Donald W., 4,957,463, Cl. 445-50.000.

Freeman, Lowell J. D. Vehicle mounted archery bow holder. 4,957,229, Cl. 224-42.45R.

Freer, Raymond F.; and Sander, Willy M. Multichannel communications recorder having the capability to display channel activity and status. 4,958,367, Cl. 379-84.000.

Freiman, Efim A.: *See*—
Kravetsky, Dmitry Y.; Zatulovsky, Lev M.; Egorov, Leonid P.; Pelts, Boris B.; Okun, Leonid S.; Freiman, Efim A.; Averyanov, Viktor V.; and Alishoev, Alexandr L., 4,957,713, Cl. 422-249.000.

Freisinger, Henry; Stritzl, Karl; and Luschnig, Franz, to TMC Corporation. Binding for cross-country ski. 4,957,305, Cl. 280-618.000.

French, Cheryl B.; and Breister, Sigmund, to Olin Corporation. Process and composition for providing reduced discoloration caused by the presence of pyrithione and ferric ion in water-based paints and paint bases. 4,957,658, Cl. 252-400.230.

Frenkel C-D Aktiengesellschaft: *See*—
Meyer, Paul, 4,957,372, Cl. 366-76.000.

Freudenreich, Ludwig: *See*—
Medler, Eberhard; Phillipi, Siefried; Vetter, Kurt; Freudenreich, Ludwig; and Lippuner, Othmar, 4,957,782, Cl. 427-421.000.

Friedrich Deckel Aktiengesellschaft: *See*—
Schneider, Manfred; Driesner, Bernd; and Luetzkendorf, Joerg, 4,957,398, Cl. 409-136.000.

Fritto-Lay Inc.: *See*—
Keller, Lewis C.; and Bowles, Cecil A., 4,958,054, Cl. 219-10.55M.

Froberg, Stig O.; and Bengtson, Lars O., to Victor Hasselblad Aktiebolag. Arrangement for determining camera setting. 4,958,182, Cl. 354-412.000.

Frolov, George, to Harrow Products, Inc. Armature for electromagnetic lock. 4,957,316, Cl. 292-251.500.

Fromm Holding AG: *See*—
Rauch, Manfred, 4,957,587, Cl. 156-495.000.

Frostl, Wolfgang; and Zust, Armin, to Ciba-Geigy Corporation. Hydrogenated 1-benzooxacycloalkylpyridinecarboxylic acid compounds. 4,957,928, Cl. 514-318.000.

Frusho, Hiroyuki: *See*—
Ohtomo, Fumio; Frusho, Hiroyuki; Nakamura, Shinichi; and Mihashi, Toshifumi, 4,958,241, Cl. 358-487.000.

Frye, Gunter: *See*—
Eskam, Armin; Frye, Gunter; and Krumm, Herbert, 4,957,035, Cl. 89-8.000.

Fuji Electric Co., Ltd.: *See*—
Kuroda, Masami; Nakamura, Youichi; and Furusho, Noboru, 4,957,837, Cl. 430-59.000.
Nishibe, Takashi; and Yokoyama, Shotaro, 4,958,362, Cl. 377-20.000.
Tanuma, Ryohei, 4,958,356, Cl. 372-59.000.

Fuji Jukogyo Kabushiki Kaisha: *See*—
Hosaka, Hiroshi, 4,957,088, Cl. 123-480.000.
Morikawa, Koji, 4,957,089, Cl. 123-486.000.
Oshita, Saiichiro; and Mouri, Toyohiko, 4,957,181, Cl. 180-79.100.

Fuji Photo Film Col, Ltd.: *See*—
Okino, Yoshiharu, 4,958,233, Cl. 358-302.000.

Fuji Photo Film Co., Ltd.: *See*—
Hara, Makoto, 4,958,281, Cl. 364-413.010.
Inoue, Nobuaki; and Sasaoka, Senzo, 4,957,849, Cl. 430-264.000.
Kobayashi, Hidetoshi; and Nishikawa, Toshihiro, 4,957,853, Cl. 430-384.000.
Komatsuzaki, Hiroshi; Kamata, Kazuo; Ohmiya, Akio; Nishimura, Syunji; Umeda, Yoshihito; Mochizuki, Noriya; and Furuya, Eiji, 4,958,179, Cl. 354-195.120.
Kubota, Kazufumi, 4,958,237, Cl. 358-451.000.
Suematsu, Koichi; Yamada, Sumito; Ohno, Shigeru; and Ito, Tadashi, 4,957,856, Cl. 430-518.000.
Takahashi, Osamu; Koyama, Koichi; and Koya, Keizo, 4,957,848, Cl. 430-203.000.
Yoshida, Toshio; Hirai, Masayoshi; Nishizawa, Tetuo; and Takamura, Masashi, 4,958,178, Cl. 354-195.120.

Fuji Xerox Co., Ltd.: *See*—
Akada, Yukihisa, 4,958,299, Cl. 364-520.000.
Yamada, Kunio; Tsukada, Shigeru; and Seki, Masao, 4,958,239, Cl. 358-457.000.

Fujihara, Kazuo; and Komori, Takahiro, to Toyoda Gosei Co., Ltd. Grilles for air conditioner. 4,957,036, Cl. 98-2.000.

Fujii, Eiji: *See*—
Aoki, Nobuyuki; Aoki, Masaki; Torii, Hideo; Ochiai, Keiichi; and Fujii, Eiji, 4,957,812, Cl. 428-329.000.

Fujii, Hideki: *See*—
Honkura, Yoshinobu; Fujii, Hideki; and Murata, Koji, 4,957,699, Cl. 420-41.000.

Fujii, Masaki; Tamura, Hitoshi; Suzuki, Kunincri; and Hatakeyama, Noboru, to Konica Corporation. Toner recovery device. 4,958,196, Cl. 355-298.000.

Fujii, Seiichi: *See*—
Teraji, Tsutomu; Yamamura, Atsushi; Kamuro, Yasuo; Hirai, Koichi; and Fujii, Seiichi, 4,957,537, Cl. 71-95.000.

Fujii, Sigezo; Uesugi, Tsuneya; and Sakamoto, Kiyoshi, to Nippon Electric Glass Co., Ltd. Apparatus for plunger replacement in a molding machine while the molding machine is in operation. 4,957,530, Cl. 65-172.000.

Fujii, Takayoshi: *See*—
Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,957,906, Cl. 514-42.000.

Fujimoto, Masashi: *See*—
Katoh, Yoshihisa; Ogawa, Takashi; Hasegawa, Mitsumasa; Fujimoto, Masashi; and Hayashi, Masaaki, 4,957,625, Cl. 210-119.000.

Fujinawa, Shohei; Sakamoto, Yoshinori; and Iizuka, Harumasa, to Takeda Chemical Industries, Ltd. Purification of inosine from guanosine. 4,958,017, Cl. 536-124.000.

Fujino, Akihiko: *See*—
Ishikawa, Norio; Nakai, Masaaki; Hirano, Masayasu; Fujino, Akihiko; Ootsuka, Hiroshi; Egawa, Takeshi; and Kawamura, Kunio, 4,958,181, Cl. 354-412.000.
Izumi, Shuji; Nakai, Masaaki; Inoue, Manabu; Fujino, Akihiko; Kawamura, Kunio; Takarabe, Yuji; and Niwa, Masatake, 4,958,184, Cl. 354-474.000.

Fujisaki, Kenichi, to Advantest Corporation. Memory testing device. 4,958,345, Cl. 371-21.300.

Fujisaki, Kenichi, to Advantest Corporation. Memory testing device. 4,958,346, Cl. 371-21.300.

Fujisawa, Eiichi: *See*—
Matsuo, Isaya; Urabe, Suehiro; and Fujisawa, Eiichi, 4,957,071, Cl. 123-52.0MV.

Fujisawa Pharmaceutical Co., Ltd.: *See*—
Nakashima, Mitsuyoshi; Kanamaru, Mitsutaka; Sugiyama, Akira; Terakawa, Masato; Ono, Takaharu; and Horiai, Haruo, 4,957,923, Cl. 514-259.000.

Fujisawa Pharmaceutical Company, Ltd: *See*—
Teraji, Tsutomu; Yamamura, Atsushi; Kamuro, Yasuo; Hirai, Koichi; and Fujii, Seiichi, 4,957,537, Cl. 71-95.000.

Fujita, Toshiyuki: *See*—
Kikuchi, Tohru; Fujita, Toshiyuki; Saito, Takayuki; Kojima, Mitsumasa; Sato, Hidetaka; and Suzuki, Hiroshi, 4,958,001, Cl. 528-346.000.

Fujitani, Yoshiyasu: *See*—
Nagai, Teizi; Tokushima, Yasuo; Kubota, Sadao; Suzuki, Kenichirou; Fujitani, Yoshiyasu; Yoshimoto, Taisuke; Muraki, Hideaki; and Tachi, Hideo, 4,957,710, Cl. 422-171.000.

Fujitsu Limited: *See*—
Hasegawa, Shin-ya; Kato, Masayuki; Yamagishi, Fumio; Ikeda, Hiroyuki; and Inagaki, Takefumi, 4,957,336, Cl. 350-3.710.
Ishii, Yasuhiro; and Fukushi, Isao, 4,958,094, Cl. 307-570.000.
Mimura, Takashi, 4,958,201, Cl. 357-16.000.
Takikawa, Masahiko, 4,958,203, Cl. 357-22.000.

Fujiwara, Masatsugu: *See*—
Sakashita, Kiichiro; Nakahara, Toshiaki; Tanikawa, Hirohide; Matsushige, Naoki; Yoshida, Satoshi; Fujiwara, Masatsugu; and Mitsuhashi, Yasuo, 4,957,840, Cl. 430-106.600.

Fujiyama, Yasutomo: *See*—
Kamiya, Osamu; and Fujiyama, Yasutomo, 4,958,185, Cl. 354-478.000.

Fukao, Masuzo; Sakai, Tadashi; and Murohashi, Kozo, to Kabushiki Kaisha Ishikawa Seisakusho, Ltd. Corrugated cardboard box stacking device in a corrugated cardboard box making machine. 4,957,409, Cl. 414-788.400.

Fukase, Toshiyuki; Sugiyama, Yoshihiro; Takanashi, Hazime; Tsubuko, Kazuo; and Kuramoto, Shinichi, to Ricoh Co., Ltd. Liquid developer for electrostatic latent images using flushed pigments. 4,957,842, Cl. 430-114.000.

Fukunaga, Yasushi: *See*—
Kanema, Seiichi; Nio, Misato; Fukunaga, Yasushi; and Nishida, Takehiko, 4,958,147, Cl. 340-706.000.

Fukushi, Isao: *See*—
Ishii, Yasuhiro; and Fukushi, Isao, 4,958,094, Cl. 307-570.000.

Fukuyama, Hidetoshi: *See*—
Matsumura, Hideo; Nishino, Hirohito; Fukuyama, Hidetoshi; Yamazaki, Kazutoshi; and Suzuki, Hiromitsu, 4,957,614, Cl. 204-411.000.

Fukuyama, Yukihiro: *See*—
Inoue, Takeshi; Hikichi, Tadasu; Fukuyama, Yukihiro; and Kondo, Akihiro, 4,957,992, Cl. 526-324.000.

Fukuzawa, Tadashi: *See*—
Ogawa, Kensuke; Katsuyama, Toshio; and Fukuzawa, Tadashi, 4,957,337, Cl. 350-96.130.

Fulford, Paul: *See*—
Ansuini, Frank; and Fulford, Paul, 4,957,616, Cl. 204-435.000.

Fullemann, Jorg; and Boner, Heinrich, to VTH AG Verfahrenstechnik Fur Heizung. Liquid fuel purifying burner. 4,957,427, Cl. 431-265.000.

Fulton, Alfred L.; Lakhani, Kishor M.; Sampson, Scott D.; and Lowman, Kent, to SCI Systems, Inc. Printing apparatus and method. 4,958,171, Cl. 346-153.100.

Funado, Shigeto: *See*—
Ando, Naotaka; and Funado, Shigeto, 4,958,156, Cl. 341-123.000.

Furuhama, Shoichi, to Nippon Piston Ring Co., Ltd. Vane pump with guide means for regulating movement of vane. 4,957,420, Cl. 418-255.000.

Furukawa Electric Co., Ltd., The: *See*—
Kobayashi, Kenzo; and Shiroishi, Hirokazu, 4,958,260, Cl. 361-398.000.
Sato, Tsugao; and Komura, Kenichi, 4,957,343, Cl. 350-96.210.

Furusho, Noboru: *See*—
Kuroda, Masami; Nakamura, Youichi; and Furusho, Noboru, 4,957,837, Cl. 430-59.000.

Furuto, Yuuji: *See*—
Koshiba, Mitsunobu; Harita, Yoshiyuki; Furuto, Yuuji; Roland, Bruno; and Lombaerts, Ria, 4,957,588, Cl. 156-628.000.

Furuya, Eiji: *See*—
Komatsuzaki, Hiroshi; Kamata, Kazuo; Ohmiya, Akio; Nishimura, Syunji; Umeda, Yoshihito; Mochizuki, Noriya; and Furuya, Eiji, 4,958,179, Cl. 354-195.120.

Furuyama, Hideto: *See*—
Kinoshita, Jun'ichi; Morinaga, Motoyasu; Furuyama, Hideto; and Hirayama, Yuzo, 4,958,202, Cl. 357-17.000.

Fusco, Ronald S.: *See*—
Nicholson, Richard D.; and Fusco, Ronald S., 4,957,823, Cl. 428-663.000.

Fuse, Hirotaka: *See*—
Ando, Manabu; Nakamura, Nobuo; Tsuchiya, Yoshitane; Fuse, Hirotaka; Watanabe, Kazuo; and Shinoda, Koushi, 4,956,944, Cl. 51-165.710.

Fusion Group PLC: *See*—
Jenkins, Patrick W.; Dunkey, Edwin A. W.; and Cartwright, Roy, 4,957,570, Cl. 156-64.000.

Fusg'Kurt, ml/a/ nger; and Krimmel, Heinz G., to Alcatel N.V. Optical communication system, particularly in the subscriber area. 4,957,339, Cl. 350-96.150.

Futamoto, Masaaki; Honda, Yukio; Asada, Seiichi; Nishimura, Takashi; Yoshida, Kazuetsu; and Ishihara, Heigo, to Hitachi, Ltd.; and Hitachi Maxell, Ltd. Magnetic recording medium and process for producing the same. 4,957,825, Cl. 428-694.000.

Futterer, Eberhard: *See*—
Bohn, Manfred; Dittmar, Walter; Peil, Heinz G.; Futterer, Eberhard; and Kraemer, Karl, 4,957,730, Cl. 424-61.000.

G & G Intellectual Properties, Inc.: *See*—
Gearin, Peter, 4,957,407, Cl. 414-498.000.

Gabryazewski, Gregory J., to Nordson Corporation. Method and apparatus for dispensing droplets of molten thermoplastic adhesive. 4,957,783, Cl. 427-424.000.

Gaertner, Dean J.; and Palamara, Eugene J., to PPG Industries, Inc. Composite bushing design. 4,957,525, Cl. 65-1.000.

GAF Chemicals Corporation: *See*—
Dragasevich, John, 4,957,635, Cl. 210-767.000.
Helioff, Michael W.; Bires, Carmen D.; and Login, Robert B., 4,957,731, Cl. 424-62.000.

Gago, Noel. Tension and web guiding system. 4,958,111, Cl. 318-6.000.

Galileo Electro-Optics Corps.: *See*—
Gray, John W., 4,958,079, Cl. 250-397.000.

Gallaher, T. L.; and Small, Thomas L., to Grain Processing Corporation. Starch conversion. 4,957,563, Cl. 127-38.000.

Gamble, Jesse: *See*—
Krishnan, Raghavan; Gamble, Jesse; Blum, David; Curran, William V.; Lee, Ving J.; and Conrow, Ransom B., 4,958,020, Cl. 540-310.000.

Gandhi, Hemant: *See*—
McCallum, Robert S.; McIntosh, Brian; and Gandhi, Hemant, 4,958,172, Cl. 346-159.000.

Gandiglio, Romolo, to Fiat Auto S.P.A. Suspension for the front steered wheels of a motor vehicle. 4,957,307, Cl. 280-666.000.

Ganon Kabushiki Kaisha: *See*—
Kadowaki, Toshihiro, 4,958,219, Cl. 358-75.000.

Garcia, Jose G.: *See*—
Wheeler, John G.; and Garcia, Jose G., 4,957,555, Cl. 106-716.000.

Gardener, Keith: *See*—
Jacobson, David; LeGrand, Robert; and Gardener, Keith, 4,957,532, Cl. 65-273.000.

Garg, Brij: *See*—
Chandrasekaran, Swayambu; Kundel, Nikhil K.; Garg, Brij; and Chin, Hong B., 4,957,961, Cl. 524-405.000.

Garrett, Chris: *See*—
Madonna, Louis; and Garrett, Chris, 4,957,237, Cl. 229-120.000.

Garrett, Steven L.: *See*—
Hofler, Thomas; Brininstool, Michael R.; Newmaster, Jeffrey T.; and Garrett, Steven L., 4,958,072, Cl. 250-231.130.

Garrigue, Roger; Lalo, Jack; and Vignau, Andre, to Norsolor S.A. Process for curing aminoplast resins. 4,957,999, Cl. 528-230.000.

Garrish, Bryan F., to Baltimore Aircoil Company. Trapezoidal fill sheet for low silhouette cooling tower. 4,957,276, Cl. 261-112.100.

Garrison, David F.: *See*—
Chou, Yu-Chia T.; Garrison, David F.; and Lewis, William I., 4,957,599, Cl. 162-78.000.

Garros, Stephen A., to SSMC Inc. Emergency battery monitor. 4,957,828, Cl. 429-92.000.

Gas Research Institute: *See*—
Bonne, Ulrich; and Matthys, Robert J., 4,958,076, Cl. 250-343.000.
Eng, Meng-Teck; and Staffin, H. Kenneth, 4,957,431, Cl. 432-31.000.
Raleigh, William F., 4,957,160, Cl. 165-160.000.

Gatenby, Robert A., to U.S. Bioscience. Photodynamic therapeutic technique. 4,957,481, Cl. 604-20.000.

Gavrila, Gelu N., to Teledyne Industries, Inc. Non-flowing modulating pilot operated relief valve. 4,957,136, Cl. 137-488.000.

Gazelle Microcircuits, Inc.: *See*—
Fitzpatrick, Mark F.; and Gouldsberry, Gary R., 4,958,089, Cl. 307-448.000.

Gearin, Peter, to G & G Intellectual Properties, Inc. Method and apparatus for loading and unloading motor vehicles from lightweight sleeves which are carried in standard cargo containers. 4,957,407, Cl. 414-498.000.

Geddes, Kenneth R., to Crown Decorative Products Limited. Process for reducing reactor fouling during polymerization in an aqueous medium. 4,957,982, Cl. 526-62.000.

Geffken, Detlef; and Rayner Dennis R., to Du Pont de Nemours, E. I., and Company. Fungicidal oxazolidinones. 4,957,933, Cl. 514-376.000.

Geisenheimer, Herman S. Direct mail advertising system. 4,957,311, Cl. 283-56.000.

General Company Ltd.: *See*—
Arai, Fumiaki; and Kimura, Masaru, 4,957,808, Cl. 428-262.000.

General Dynamics Corp., Pomona Division: *See*—
Branigan, John T.; and Wronski, Michael W., 4,958,166, Cl. 343-771.000.

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Scuccato, Serge L.; and Stevenson, Andrew C., 4,958,380, Cl. 388-806.000.

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Guerin, Christine; Penato, Jean-Marie; and Debrouwer, Yves, 4,958,364, Cl. 378-144.000.

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Dowdy, Mack W.; and Benko, Donald J., 4,957,157, Cl. 165-104.270.
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Hibbert, David A.; Harton, Lynn M.; Anderson, John D.; and Richards, Anthony L., 4,957,447, Cl. 439-207.000.
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Krishna, Surinder; Torreno, Manuel L., Jr.; and Adler, Michael S., 4,958,210, Cl. 357-34.000.
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Piazza, Thomas A., 4,958,305, Cl. 364-522.000.
Scheidt, Wilbur D.; Whitney, Eric J.; and Pratt, Vanon D., 4,958,058, Cl. 219-121.600.
Sum, Michael J.; Bennett, George W.; Merrell, Steven A.; and Walker, Neil, 4,958,289, Cl. 364-431.010.
Temple, Victor A., 4,958,211, Cl. 357-38.000.

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Hawranek, Jerzy; and Jakobsson, Karl P., 4,958,138, Cl. 338-114.000.

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Banner, Alvin C.; Clemenz, Gary E.; and Walton, Ballard E., 4,956,910, Cl. 29-593.000.
Chandley, George D., 4,957,153, Cl. 164-7.100.
Kia, Hamid G., 4,957,684, Cl. 264-257.000.
Kuhlman, Howard W., 4,956,939, Cl. 49-347.000.
Mentzer, Charles C.; Cox, Howard W.; and Short, William T., 4,957,802, Cl. 428-174.000.
Myers, Christopher S.; and Wozniak, Thomas H., 4,957,670, Cl. 264-40.100.
Plackard, Dennis L.; and Chafin, William J., 4,957,668, Cl. 264-23.000.
Zollinger, Donovan J., 4,957,469, Cl. 464-175.000.

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Wilson, Donald L.; and Trippe, Jerry C., 4,957,636, Cl. 210-242.300.

George, Coralie: *See*—
Olander, John W.; and George, Coralie, 4,957,756, Cl. 426-243.000.

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Kraft, Kenneth N.; and Allen, R. Craig, 4,957,129, Cl. 134-151.000.

Gerow, Frank J., to Baylor College of Medicine. External male urinary catheter and collection system. 4,957,487, Cl. 604-133.000.

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Gilchrist, William T., Jr. Garment cover. 4,957,203, Cl. 206-286.000.

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Alessi, Paula J.; Faul, William H.; Giorgianni, Edward J.; Koop, Donald A.; and Madden, Thomas E., 4,958,220, Cl. 358-76.000.

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McMaster, Harold A.; and Balestra, Ben M., 4,957,531, Cl. 65-273.000.

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Godfrey, Neil; Coates, Ian H.; Bell, James A.; Humber, David C.; and Ewan, George B., 4,957,609, Cl. 204-157.710.

Gleason, David D.: *See*—
Hiestand, Everett N.; Balog, Stephen; and Gleason, David D., 4,957,003, Cl. 73-818.000.

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Globe Products Inc.: *See*—
Banner, Alvin C.; Clemenz, Gary E.; and Walton, Ballard E., 4,956,910, Cl. 29-593.000.
Globe-Union Inc.: *See*—
Jones, Kenneth R., 4,957,830, Cl. 429-101.000.
Glorie, Patrick: *See*—
Verclyte, Eddy; Meyns, Ignace; and Glorie, Patrick, 4,957,145, Cl. 139-434.000.
Glorioso, John D., to Enviro-Gro Technologies. Sludge treatment process. 4,956,926, Cl. 34-111.000.
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Steeg, Michael; Neuhsus, Peter; Roth, Albert; and Engel, Ulrich, 4,957,822, Cl. 428-653.000.
Godfrey, Neil; Coates, Ian H.; Bell, James A.; Humber, David C.; and Ewan, George B., to Glaxo Group Limited. Process for preparing N-heterocyclic compounds. 4,957,609, Cl. 204-157.710.
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Roth, Maxim; Godwin, Jimmy D.; and Williams, Roger O., 4,958,245, Cl. 360-77.030.
Goebel, Eickhart, to Hofmann Werkstatt-Technik GmbH. Apparatus for driving a motor vehicle wheel for determining unbalance thereof. 4,956,998, Cl. 73-457.000.
Goebel, Johannes C.: *See*—
Fortuin, Johannes M. H.; Goebel, Johannes C.; and Simons, Antonius J. F., 4,957,627, Cl. 210-679.000.
Goetze AG: *See*—
Duck, Gerhard; Brillert, Hans-Rainer; and Mierbach, Albin, 4,957,212, Cl. 277-217.000.
Goldberg, Bar-Giora. Digital frequency synthesizer having multiple processing paths. 4,958,310, Cl. 364-718.000.
Golden, Timothy C.; Kumar, Ravi; and Kratz, Wilbur C., to Air Products and Chemicals, Inc. Hydrogen purification. 4,957,514, Cl. 55-26.000.
Goldowsky, Michael P. Balanced radial engine. 4,957,072, Cl. 123-55.00A.
Goldstar Instrument & Electric Co., Ltd.: *See*—
Han, Sang Soo, 4,958,062, Cl. 219-497.000.
Goldstein, Shyke A.: *See*—
Sohval, A. Robert; Cooperstein, Gerald; Goldstein, Shyke A.; and Hearn, David R., 4,958,365, Cl. 378-122.000.
Gomberg, Edward N. Method for placing an inner tube into a tire lined with sealant. 4,957,573, Cl. 156-115.000.
Gonser, Donald I.; and Reinhart, Douglas M., to Den-Tal-Ez, Inc. Sterilizable syringe. 4,957,483, Cl. 604-30.000.
Gonzales, Arthur V. Seat-supported coat hanger for automobiles. 4,957,230, Cl. 224-42.46A.
Gonzalez, Luis M. Compound clamp with adjustable perpendicular clamping component. 4,957,257, Cl. 248-231.700.
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Clayton, Andrew R.; and Cronin, Robert A., 4,957,574, Cl. 156-126.000.
Cohn, Gerald, 4,957,945, Cl. 521-182.000.
Cronin, Robert A., 4,957,575, Cl. 156-126.000.
Greenwood, Alan, 4,957,676, Cl. 264-102.000.
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Goostree, James D.: *See*—
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Gopinathan, Venugopal; and Tan, Khen-Sang, to Texas Instruments Incorporated. Dual feedback tuning method and apparatus. 4,958,120, Cl. 328-155.000.
Gormley, David E.: *See*—
Hill, Johnny L.; and Gormley, David E., 4,957,254, Cl. 248-207.000.
Goseki, Yasuhide: *See*—
Doi, Shinji; Yoshida, Satoshi; Matsunaga, Satoshi; Kawakami, Hiroaki; Kasuya, Takashige; Goseki, Yasuhide; and Karami, Yusuke, 4,957,774, Cl. 427-45.100.
Goswami, Bhuvenesh C.: *See*—
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Goto, Tetsuro; and Miura, Kosho, to Nikon Corporation. Data recording device for camera. 4,958,174, Cl. 354-106.000.
Gotoh, Shinya: *See*—
Kinashi, Hiroshi; Kawabata, Itaru; Yamane, Hidenobu; Tsujimoto, Yoshiharu; Gotoh, Shinya; and Nawa, Masayoshi, 4,958,197, Cl. 355-299.000.
Gotoh, Taiji: *See*—
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Gottwald, Winfried, to Siemens Aktiengesellschaft. Magnetic tape recorder having tape buffer vacuum chambers and ante chambers. 4,958,247, Cl. 360-90.000.
Gouldsberry, Gary R.: *See*—
Fitzpatrick, Mark F.; and Gouldsberry, Gary R., 4,958,089, Cl. 307-448.000.
GP Taurio, Inc.: *See*—
Bohannan, William L.; Harrington, J. Vincent; and Pfister, John K., 4,956,999, Cl. 73-587.000.
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Grabbe, Dimitry G., to AMP Incorporated. Method of constructing a monolithic block having an internal geometry and the block resulting therefrom. 4,957,800, Cl. 428-136.000.
Graefe, Jurgen; Uzick, Wolfram; and Weinberg, Udo, to Schering Aktiengesellschaft. Methods for producing diorganodialkoxysilanes. 4,958,041, Cl. 556-480.000.
Graham, Roger K.: *See*—
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Gallaher, T. L.; and Small, Thomas L., 4,957,563, Cl. 127-38.000.
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Granger, James P. Drywall T-square. 4,956,919, Cl. 33-32.200.
Gravestock, Michael B.: *See*—
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Gray, John W., to Galileo Electro-Optics Corp. Detector for scanning electron microscopy apparatus. 4,958,079, Cl. 250-397.000.
Gray, Lewis, to Westinghouse Electric Corp. Bi-directional pressure sensing probe. 4,957,007, Cl. 73-861.650.
Green, John. Self clamping device. 4,956,899, Cl. 24-488.000.
Green, Reid B.: *See*—
Hankins, Robert B.; and Green, Reid B., 4,957,440, Cl. 433-201.100.
Green, William P. Formation of fasteners and connections with variable pitch threads. 4,956,888, Cl. 10-86.00A.
Greenberg, George. Leaf wagon. 4,957,306, Cl. 280-652.000.
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Greenwell, Joseph D.: *See*—
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Greenwood, Alan, to Goodyear Tire & Rubber Company, The. Detachment of tires from molds. 4,957,676, Cl. 264-102.000.
Greiner, Alain; Sun, Xiaowei; and Thill, Michel, to Bull S.A. Device for calculating the parity bits of a sum of two numbers. 4,958,353, Cl. 371-49.400.
Grier-Idris, Carletta, to Kimberly-Clark Corporation. Surgical drape with extremity pouch. 4,957,120, Cl. 128-849.000.
Gries, Heinz; Rosenberg, Douwe; and Weinmann, Hanns-Joachim, to Schering Aktiengesellschaft. Sterile pharmaceutical compositions of gadolinium chelates useful enhancing NMR imaging. 4,957,939, Cl. 514-492.000.
Griess, Herbert C., to Pittway Corporation. Water-flow detector. 4,958,144, Cl. 340-606.000.
Griffiths, Gareth: *See*—
Mettler, Hans P.; Griffiths, Gareth; Mills, Lester; and Previdoli, Felix, 4,958,044, Cl. 558-431.000.
Grinnell, Frederick, to Board of Regents, the University of Texas System. Peptide inhibitors of wound contraction. 4,957,902, Cl. 514-17.000.
Gritter, David, to Eaton Corporation. Current control for microprocessor motor drive. 4,958,269, Cl. 364-153.000.
Groeger, Jeffrey; and Miodownik, Saul, to Cardiac Spectrum Technologies, Inc. Electrocardiograph system. 4,957,109, Cl. 128-640.000.
Grobe, Klaus; and Schriewer, Michael, to Bayer Aktiengesellschaft. Intermediates for preparing 1,8-bridged 4-quinolone-3-carboxylic acids. 4,958,045, Cl. 560-20.000.
Grollier, Jean F.; and Caudet, Alain, to L'Oreal. Shaving composition for the skin based on polyorgano-siloxanes containing an acyloxyalkyl group and process for use. 4,957,732, Cl. 424-73.000.
Gros, Jean-Bernard: *See*—
Creuly, Catherine; Gros, Jean-Bernard; and Larroche, Christian, 4,957,862, Cl. 435-148.000.
Grosjean, Laurent, to ETA SA Fabriques d'Ebauches. Bracelet of metallic construction and watch provided with such a bracelet. 4,958,334, Cl. 368-282.000.
Grover, Bhadra S.; and Nagji, Moez M., to UOP. Gas treatment process. 4,957,715, Cl. 423-228.000.
Groves, Joel L.: *See*—
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Hill, Susan C.; Jelemensky, Joseph; Heene, Mark R.; Groves, Stanley E.; and DeBrito, Daniel N., 4,958,277, Cl. 364-200.000.
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Gruenhagen, Hans-Heinrich: *See*—
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Grumman Aerospace Corporation: *See*—
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Noonan, Denis E., 4,956,991, Cl. 72-370.000.
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Gsellmann, Josef: *See*—
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GTE Laboratories Incorporated: *See*—
Boudreau, Robert A.; and Rideout, William C., 4,957,342, Cl. 350-96.180.
Sarin, Vinod K.; D'Angelo, Charles; and Rebenne, Helen E., 4,957,780, Cl. 427-255.200.
GTE Mobilnet Incorporated: *See*—
Parker, Terry S., 4,958,368, Cl. 379-91.000.
GTE Products Corp.: *See*—
Kidd, Dan; Napiorkowski, John J.; and Atkinson, Bruce D., 4,958,254, Cl. 361-119.000.
Mizuhara, Howard, 4,957,236, Cl. 228-263.210.
Gubia, Jean; Chatelain, Pierre; Descamps, Marcel; Nisato, Dino; Inion, Henri; Lucchetti, Jean; Mahaux, Jean-Marie; and Vallat, Jean-Noel, to Sanofi. Aminoalkoxyphenyl derivatives, process of preparation and compositions containing the same. 4,957,925, Cl. 514-299.000.
Gubisch, Roland W.: *See*—
Davidson, David L.; Parrent, George B., Jr.; Gubisch, Roland W.; and Hauer, Harold, 4,958,295, Cl. 364-497.000.
Guentner, Andreas; Mayer, Udo; and Oberlinner, Andreas, to BASF Aktiengesellschaft. Benzopyran derivatives. 4,958,021, Cl. 544-129.000.
Guerin, Christine; Penato, Jean-Marie; and Debrouwer, Yves, to General Electric CGR SA. Rotating anode of composite material for X-ray tubes. 4,958,364, Cl. 378-144.000.
Guettouche, Ali; and Graafmann, Jurgen, to Wavin B. V. Waste pipe system comprising plastic pipe parts made of thermoplastic material with sound-proofing properties. 4,957,793, Cl. 428-36.400.
Guillemette, Alfred N.: *See*—
Picollo, August J.; and Guillemette, Alfred N., 4,957,268, Cl. 249-10.000.
Guillon, Jean-Claude; and Rufray, Jean-Claude, to Deutsche Thomson-Brandt GmbH. Method and device for the area enlargement of a television picture. 4,958,229, Cl. 358-180.000.
Gulczynski, Zdzislaw. Ultra fast digital-to-analog converter with independent bit current source calibration. 4,958,155, Cl. 341-120.000.
Gunter, William D.: *See*—
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Gupta, Pramod K.; and Pullman, Gerald S., to Weyerhaeuser Company. Method for reproducing coniferous plants by somatic embryogenesis. 4,957,866, Cl. 435-240.400.
Gurtner, Bernard: *See*—
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Gustafson, Keith W. Shutoff valve for cryogenic liquid storage tank. 4,956,975, Cl. 62-50.700.
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Gwin, Hal S.; and Aaron, James R., to United States of America, National Aeronautics and Space Administration. Low-noise nozzle valve. 4,957,139, Cl. 137-556.000.
Haapala, Urho S.: *See*—
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Haas, Franz: *See*—
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Haddad, Muin S.; and Eryman, William S., to Amoco Corporation. Process for manufacture of maleic anhydride catalysts. 4,957,894, Cl. 502-209.000.
Haddox, Holly A. Hanger for plant container. 4,956,937, Cl. 47-67.000.
Hagen, Helmut; Kohler, Rolf-Dieter; and Dupuis, Jacques, to BASF Aktiengesellschaft. Preparation of 8-bromomethyl-3-methylquinoline compounds. 4,957,608, Cl. 204-157.710.
Hagiwara, Yoshimune: *See*—
Kiuchi, Atsushi; Kaneko, Kenji; Ishida, Jun; Nakagawa, Tetsuya; Hagiwara, Yoshimune; Akazawa, Takashi; and Sato, Tomoru, 4,958,276, Cl. 364-200.000.
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Hakanen, Pekka, to Nokia-Mobira Oy. Mounting base for a telephone device, such as a mobile telephone. 4,957,264, Cl. 248-510.000.
Hakulinen, Vesa. Method of metering detergent. 4,956,887, Cl. 8-158.000.
Hale, Douglas B., to Oppenheimer Companies. Potato preservation method. 4,957,761, Cl. 426-410.000.
Hale, Paul S.; and Shin, Kju H., to Ethyl Corporation. Alkenyl succinic anhydrides process. 4,958,034, Cl. 549-255.000.
Hall, David M.: *See*—
McCullough, Francis P., Jr.; Goswami, Bhuvenesh C.; Seelgrove, R. Vernon; and Hall, David M., 4,957,807, Cl. 428-222.000.
Halliburton Co.: *See*—
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Halliday, Robert L.: *See*—
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Hamakawa, Wataru, to Minolta Camera Kabushiki Kaisha. Automatic document feeder and a copying apparatus equipped with such an automatic document feeder. 4,958,198, Cl. 355-309.000.
Hamamatsu Photonics Kabushiki Kaisha: *See*—
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Hamamoto, Takashi: *See*—
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Hamer, James D., to Minnesota Mining and Manufacturing Company. Method of reducing surface defects in a positive dental model. 4,957,667, Cl. 264-16.000.
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Hamilton, John G. Ventilation device. 4,957,038, Cl. 98-87.000.
Hamilton, Michael N.; and Stolz, Edwin J., to Toledo Scale Corporation. Enclosed moment-insensitive load cell. 4,957,177, Cl. 177-211.000.
Hamisch, Paul H., Jr.; and Wisecup, David R., to Monarch Marking Systems, Inc. Printing apparatus. 4,957,379, Cl. 400-120.000.
Hamlett, Bruce B. Compound bow having a pistol grip. 4,957,093, Cl. 124-24.100.
Hammel, Ernst: *See*—
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Han, Chul W.: *See*—
Min, Suk K.; Park, Seung C.; and Han, Chul W., 4,957,711, Cl. 422-245.000.
Han, Sang Soo, to Goldstar Instrument & Electric Co., Ltd. Driving control apparatus for an electric range with self-diagnosis function. 4,958,062, Cl. 219-497.000.
Hanaoka, Takashi: *See*—
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Haneda, Hisao: *See*—
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Hankins, Robert B.; and Green, Reid B. Process for preparing non-shrinking porcelain opaque covering for dental appliances. 4,957,440, Cl. 433-201.100.
Hansen, Hannelore G.: *See*—
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Macholdt, Hans-Tobias; Sieber, Alexander; Schui, Franz; and Deubel, Reinhold, 4,957,841, Cl. 430-110.000.
Staendeke, Horst; and Scharf, Daniel, 4,957,950, Cl. 523-205.000.
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Cussler, Edward L., 4,957,620, Cl. 210-635.000.
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Lamonte, Ronald R., 4,957,996, Cl. 528-181.000.
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Barner, Richard; and Hubscher, Josef, 4,958,035, Cl. 549-408.000.
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Heimer, Edgar P.; and Reddy, Premkumar E., 4,957,737, Cl. 424-88.000.
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Seitz, Edwin, 4,957,265, Cl. 248-549.000.
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Pettingell, James T.; and Hollman, Kenneth F., 4,956,923, Cl. 33-558.000.
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Nakashima, Mitsuyoshi; Kanamaru, Mitsutaka; Sugiyama, Akira; Terakawa, Masato; Ono, Takaharu; and Horisi, Haruo, 4,957,923, Cl. 514-259.000.
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Howarth, John J., to Measurex Corporation. Coating weight measuring and control apparatus and method. 4,957,770, Cl. 427-9.000.
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Sakamoto, Nagahiro, 4,958,083, Cl. 250-572.000.
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Pickering, James A.; Johnston, Joseph R.; and Fisher, Thomas A., 4,957,094, Cl. 124-24.100.
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Anderson, Patrick E.; Bunten, Roland J.; Higgins, William T.; Hruby, Ronda J.; and Mirabeau, Serge, 4,958,273, Cl. 364-200.000.
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Potember, Richard S.; Speck, Kenneth R.; and Hu, Henry S., 4,957,725, Cl. 423-592.000.
Hu, Ming C. Gauge developer. 4,956,924, Cl. 33-561.100.
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Huebner, Fritz, to Plascore, Inc. Method for making welded honeycomb core. 4,957,577, Cl. 156-197.000.
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Chesler, Ronald B., 4,957,364, Cl. 356-73.100.
Engelsman, Ronald L., 4,958,141, Cl. 340-146.200.
Lepore, Robert G.; Hansen, Hannelore G.; and Steinman, Vivien Y., 4,958,224, Cl. 358-126.000.
Myers, Christopher S.; and Wozniak, Thomas H., 4,957,670, Cl. 264-40.100.
Olson, Mark; and Quan, Clifton, 4,957,456, Cl. 439-578.000.
Rosen, Robert A.; and Krikorian, Kapriel A., 4,958,361, Cl. 375-102.000.
Wenke, Gerhard, 4,958,257, Cl. 361-385.000.
Hughes, John B., to U.S. Philips Corporation. Circuit arrangement for processing sampled analogue electrical signals. 4,958,123, Cl. 323-316.000.
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Mathers, James P.; and Humpal, Kathleen M., 4,957,554, Cl. 106-35.000.
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Mamone, John R.; Hutcheson, Neale C.; Mallozzi, Joseph D.; Daniels, Edward P.; and Cheng, Chikou, 4,958,291, Cl. 364-464.020.
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Hyatt, James R., to Nicolet Instrument Corporation. Method and apparatus for automatically calibrating the gain and offset of a time-shifted digitizing channel. 4,958,139, Cl. 340-122.000.
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Mitchell, William J.; and Fosse, Navarro T., 4,957,424, Cl. 425-145.000.
I. J. White Co.: *See*—
Irwin, Guy L., 4,957,597, Cl. 198-831.000.
Ibiden Co., Ltd.: *See*—
Yamada, Masaya, 4,957,589, Cl. 156-643.000.
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Kobayashi, Shigeo; Hiramatsu, Toshio; Yamamoto, Katsumasa; and Ichikawa, Nobuhiko, 4,957,980, Cl. 525-425.000.
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ICI Americas Inc.: *See*—
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Michaely, William J., 4,957,538, Cl. 71-98.000.
Prisbylla, Michael P., 4,958,028, Cl. 548-309.000.
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Okumura, Ryozo; Terada, Eiichi; and Kawazoe, Shigemi, 4,957,964, Cl. 525-64.000.

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Iida, Kazumi: *See*—
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Iida, Yukiari, to Precision Fukuhara Works, Ltd. Circular knitting machine with multiple number of feeds. 4,956,981, Cl. 66-20.000.
IIT Research Institute: *See*—
Roark, Steven D., 4,957,164, Cl. 166-263.000.
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Fujinawa, Shohei; Sakamoto, Yoshinori; and Iizuka, Harumasa, 4,958,017, Cl. 536-124.000.
Iizuka, Shunichi; Sakamaki, Yoshiyuki; and Shimoyama, Noriyuki, to Adeka Argus Chemical Co., Ltd. Stabilizer compositions for polyvinyl chloride resins and stabilized polyvinyl chloride resin compositions. 4,957,954, Cl. 524-102.000.
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Ilderem, Vida; Reif, L. Rafael; and Tedrow, Prabha K., to Massachusetts Institute of Technology. Very low pressure chemical vapor deposition process for deposition of titanium silicide films. 4,957,777, Cl. 427-55.000.
Ilenda, Casmir S.; Bortnick, Newman; Graham, Roger K.; and Work, William J., to Rohm and Haas Company. Graft copolymers and blends thereof with polyolefins. 4,957,974, Cl. 525-301.000.
Illinois Tool Works, Inc.: *See*—
Boeckmann, Hugo; and Van Erden, Donald, 4,958,053, Cl. 206-330.000.
Image Recognition Equipment Corporation: *See*—
Kirkpatrick, Robert D., 4,958,064, Cl. 235-384.000.
Imai, Akio: *See*—
Takao, Hiroyoshi; Imai, Akio; Seki, Tomoski; and Tsuji, Mitsuji, 4,957,976, Cl. 525-340.000.
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Imai, Yoshihiko; Nakano, Yoshio; Ando, Makoto; Iwamura, Yoshiyuki; and Ishida, Takashi, to Matsushita Electric Industrial Co., Ltd. Information recording/reproducing apparatus. 4,958,314, Cl. 364-900.000.
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Asakura, Yasuo; Toyofuku, Toshiyuki; and Imai, Yuji, 4,958,175, Cl. 354-152.000.
Imamura, Seiichiro; Terui, Sadao; Sano, Kunio; Nishikawa, Kazuyoshi; and Inoue, Akira, to Nippon Shokubai Kagaku Kogyo Co., Ltd. Method of disposal of organic chlorine compounds by combustion. 4,957,717, Cl. 423-240.000.
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Imax Systems Corporation: *See*—
Shaw, William C., 4,957,361, Cl. 352-59.000.
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Silvestrini, Jesus A.; and Barbier, Jose E., 4,957,043, Cl. 99-472.000.
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Adkins, Kelvin P., 4,957,816, Cl. 428-411.100.
Boyle, Francis T., 4,957,934, Cl. 514-383.000.
Shaw, Gordon; and Lopez-Merono, Jose, 4,958,042, Cl. 588-363.000.
Worthington, Paul A.; Crowley, Patrick J.; and Gravestock, Michael B., 4,957,539, Cl. 71-92.000.
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Inagaki, Takefumi: *See*—
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Chen, Tai J., 4,957,836, Cl. 430-59.000.
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Rohloff, Pete, 4,957,621, Cl. 210-171.000.
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Samarut, Jacques; Verdier, Gerard; Benchaibi, Miloud; Savatier, Pierre; Poncet, Didier; Flamant, Frederic; Xiao, Jiao-Hao; Thoraval, Pierrick; Chambonnet, Frederique; and Nigon, Victor, 4,957,865, Cl. 435-235.000.
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Tam, Simon M.; and Lai, Stefan K. C., 4,957,877, Cl. 437-43.000.
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Ishii, Yasuhiro; and Fukushi, Isao, to Fujitsu Limited. Emitter follower circuit with MOSFET. 4,958,094, Cl. 307-570.000.
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Ishiwata, Ichiro, to Nippon Air Brake Co., Ltd. Hydraulic pressure control valve for use with brake master cylinder. 4,957,140, Cl. 137-505.250.
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Isono, Masanao; Kawamura, Ken; Asano, Masaya; Suzuki, Tetuo; and Abiko, Shigeo, to Toray Industries, Incorporated. Printing plate. 4,957,845, Cl. 430-156.000.
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Itagaki, Takaharu; Shiraga, Mitsuaki; Sawayama, Shigeru; and Satoh, Kohichi, to Mitsubishi Kasei Corporation. Vinylamine copolymer, flocculating agent etc. 4,957,977, Cl. 525-328.400.
Ito, Fumio: *See*—
Kanegae, Masatomo; Kogano, Takayoshi; and Ito, Fumio, 4,957,781, Cl. 427-255.300.
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Ito, Kengo: *See*—
Yasuda, Akio; and Ito, Kengo, 4,957,352, Cl. 350-353.000.
Ito, Masazumi, to Minolta Camera Kabushiki Kaisha. Image forming apparatus. 4,958,190, Cl. 355-228.000.
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Suematsu, Koichi; Yamada, Sumito; Ohno, Shigeru; and Ito, Tadashi, 4,957,856, Cl. 430-518.000.
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Nakamura, Masao; Sakamoto, Norio; and Ito, Takashi, 4,957,247, Cl. 242-67.10R.
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Ito, Yasuaki; Suzuki, Takehiko; and Shimeki, Hirokazu, to Canon Kabushiki Kaisha. Projection exposure apparatus and method of correcting projection error. 4,958,160, Cl. 355-53.000.
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Ivanova, Lilia N.; Rozhkova, Irina V.; Semenikhina, Vera F.; Knyazeva, Tatyana N.; and Chagarovsky, Alexandr P., to Vsesojuzny Nauchno-Issledovatelsky I Konstruktorsky Institut Molochnoi Promyshlennosti. Process for producing kefir. 4,957,752, Cl. 426-43.000.
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Iyori, Yusuke: *See*—
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Doescher, Robert D.; and Skeel, James C., 4,957,324, Cl. 296-190.000.
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Jakob, Roland: *See*—
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Jakobsson, Karl P.: *See*—
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Jakubas, Gary P., to Taurus Precision, Inc. Drum lock device. 4,957,317, Cl. 292-256.670.

Jakubiec, Antoni F.; and Daley, Thomas M., to Varian Associates, Inc. Mechanism for selectively locking and unlocking a translatable shaft. 4,957,018, Cl. 74-531.000.

James River II, Inc.: *See*—
Moore, Neal E., 4,957,679, Cl. 264-152.000.

Janda, Marvin E.: *See*—
Schwartz, Bernard A.; Tew, Tommy L.; and Janda, Marvin E., 4,958,170, Cl. 346-136.000.

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Kennis, Ludo E. J.; Vandenberk, Jan; and Mertens, Josephus C., 4,957,916, Cl. 514-254.000.

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Nakaniwa, Shinpei; and Tomisawa, Naoki, 4,957,083, Cl. 123-436.000.
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Koshiba, Mitsunobu; Harita, Yoshiyuki; Furuto, Yuuji; Roland, Bruno; and Lombaerts, Ria, 4,957,588, Cl. 156-628.000.

Jaquemar, Christian: *See*—
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Jardine, Stuart; McCann, Dominic; and Lesage, Marc, to Anadrill, Inc. Method and apparatus for determining characteristics of the movement of a rotating drill string including rotation speed and lateral shocks. 4,958,125, Cl. 324-162.000.

Jarnagin, Jerry; and Dawson, Dennis W., to Radon Home Products, Inc. Method and apparatus for sub-floor collection and disposal of radon gas. 4,957,394, Cl. 405-128.000.

Jaumot, Jean-Pierre: *See*—
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Jelemensky, Joseph: *See*—
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Jensen, Millard J.: *See*—
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Jesmar S. A.: *See*—
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Jidosha Kiki Co., Ltd.: *See*—
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Jinoian, Vanik N.; Morrow, Ray E.; and Whitehill, Wayne W., to Vident, Inc. Dental laboratory die tray. 4,957,435, Cl. 433-34.000.

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Jacobson, Klas; and Johansson, Hakan, 4,957,901, Cl. 505-1.000.

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John Fluke Mfg. Co., Inc.: *See*—
White, Bruce T.; Polstra, John D.; and Johnson, Craig V., 4,958,347, Cl. 371-29.500.

John, Julius F., to Home Fashions, Inc. Valance support bracket. 4,957,255, Cl. 248-222.300.

Johns Hopkins University, The: *See*—
Potember, Richard S.; Speck, Kenneth R.; and Hu, Henry S., 4,957,725, Cl. 423-592.000.

Johnson, Craig V.: *See*—
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Johnson, David H., to Commercial Structures, Inc. Trailer with portable toilet facilities. 4,957,323, Cl. 296-181.000.

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McAllister, Jerome W.; Kinzer, Kevin E.; Mrozinski, James S.; Johnson, Eric J.; and Dyrud, James F., 4,957,943, Cl. 521-64.000.

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Johnston, Joseph R.: *See*—
Pickering, James A.; Johnston, Joseph R.; and Fisher, Thomas A., 4,957,094, Cl. 124-24.100.

Jones, Kenneth R., to Globe-Union Inc. Rechargeable metal oxide-hydrogen battery. 4,957,830, Cl. 429-101.000.

Jones, Martha W., Executrix: *See*—
Jones, Wickliffe, deceased; Scarpa, Eric W.; Greenwell, Joseph D.; Nease, Mark R.; Kalany, Robert M.; and Myers, Michael E., 4,956,964, Cl. 53-570.000.

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Jonnalagadda, Krishnamurthy; Gibson, James J.; and Wagner, Theodor M., to General Electric Company. Method of transmitting auxiliary information in a television signal. 4,958,230, Cl. 358-186.000.

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Jorgensen, Jeffrey A., to Avtech Corporation. Universal fluorescent lamp ballast. 4,958,108, Cl. 315-307.000.

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Ruggeberg, Klaus; and Jose, Horst-Udo, 4,957,832, Cl. 429-164.000.

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Widmar, Craig C.; Tripp, Dale; and Ficca, Vincent G., 4,957,765, Cl. 426-586.000.

Journee, Maurice A., to Paul Journee S.A. Double channel blade for a windshield wiper. 4,956,890, Cl. 15-250.360.

Julius Blum Gesellschaft m.b.H.: *See*—
Maier, Friedrich; Dubach, Fredi; Rock, Erich; and Brustle, Klaus, 4,956,956, Cl. 52-584.000.

Jung, Hyun W.: *See*—
Ku, Bon J.; and Jung, Hyun W., 4,958,176, Cl. 354-173.110.

Juvan, Christian H. A. Separation of dissolved and undissolved substances from liquids using high energy discharge initiated shock waves. 4,957,606, Cl. 204-164.000.

Juvinall, John W.; and Redmond, Robert C., to Owens-Brockway Glass Container Inc. Inspection of container finish. 4,958,223, Cl. 358-106.000.

K & H Industries, Inc.: *See*—
Baake, Karl A., 4,958,267, Cl. 362-399.000.

K.S. Sanoyas Co. Ltd.: *See*—
Nasu, Kenji, 4,957,387, Cl. 403-322.000.

Kabushiki Kaisha Ishikawa Seisakusho, Ltd.: *See*—
Fukao, Masuzo; Sakai, Tadashi; and Murohashi, Kozo, 4,957,409, Cl. 414-788.400.

Kabushiki Kaisha Kobe Seiko Sho: *See*—
Tsuboi, Noboru, 4,957,417, Cl. 417-423.130.

Kabushiki kaisha Kobe Seiko Shoe: *See*—
Hikosaka, Akihide; Mimura, Tsuyoshi; Suzuki, Tomio; Yoshigae, Takeo; and Itoh, Shuzo, 4,957,545, Cl. 75-501.000.

Kabushiki Kaisha Komatsu Seisakusho: *See*—
Kubo, Kazuo, 4,957,019, Cl. 74-665.00H.

Kabushiki Kaisha Tokai Rika Denki Seisakusho: *See*—
Okamura, Naokatsu; Yamaguchi, Noboru; Masuda, Shuji; and Kanou, Noboru, 4,956,983, Cl. 70-241.000.

Kabushiki Kaisha Topcon: *See*—
Ohtomo, Fumio; Frusho, Hiroyuki; Nakamura, Shinichi; and Mihashi, Toshifumi, 4,958,241, Cl. 358-487.000.

Kabushiki Kaisha Toshiba: *See*—
Itoh, Hitoshi; and Moriya, Takahiko, 4,957,880, Cl. 437-192.000.
Kinoshita, Jun'ichi; Morinaga, Motoyasu; Furuyama, Hideto; and Hirayama, Yuzo, 4,958,202, Cl. 357-17.000.
Kinoshita, Junichi, 4,958,357, Cl. 372-96.000.
Kobayashi, Hironobu, 4,958,301, Cl. 364-521.000.
Kojima, Shinjiro; Matsuda, Hideo; Iwasaki, Masami; and Uetake, Yoshinari, 4,958,215, Cl. 357-79.000.
Koyama, Ikuo; and Ohata, Hajime, 4,958,339, Cl. 369-98.000.
Nishimura, Seikichi, 4,958,307, Cl. 364-551.010.
Ochii, Kiyofumi; Matsui, Masataka; and Ozawa, Osamu, 4,958,316, Cl. 365-63.000.
Ohkawa, Hideki, 4,957,824, Cl. 428-694.000.
Saitoh, Shiroh; Izumi, Mamoru; Suzuki, Syuzi; and Abe, Kazuhide, 4,958,327, Cl. 367-7.000.
Saitoh, Susumu; Taniguchi, Syozo; Enomoto, Akio; and Matsuzawa, Teruyoshi, 4,958,296, Cl. 364-509.000.
Sakurai, Takayasu, 4,958,326, Cl. 365-218.000.

Sawa, Takao; Okamura, Masami; Yamada, Taiju; Kusaka, Takao; and Sasaki, Hiroshi, 4,958,134, Cl. 333-12.000.
Shimanuki, Masanobu, 4,958,370, Cl. 379-157.000.
Takakura, Hiroshi; Iida, Tetsuya; and Goto, Junkei, 4,958,222, Cl. 357-84.000.
Tanaka, Shigeru, 4,958,092, Cl. 307-480.000.
Tawara, Kiyoshi; Ema, Takehiro; and Nishihara, Eitaro, 4,958,283, Cl. 364-413.130.
Tominaga, Mamoru; Mori, Leo; and Akiyama, Junetsu, 4,957,370, Cl. 356-381.000.
Usami, Toshiro; Kamijo, Hiroyuki; Ohta, Takao; and Ogino, Masanobu, 4,958,373, Cl. 382-8.000.
Ushiki, Hiroshi; and Iwasaki, Tetsuaki, 4,958,151, Cl. 340-784.000.

Kabushiki Kaisha Toyota Chou Kenkyusho: *See*—
Nagai, Teizi; Tokushima, Yasuo; Kubota, Sadao; Suzuki, Kenichirou; Fujitani, Yoshiyasu; Yoshimoto, Taisuke; Muraki, Hideaki; and Tachi, Hideo, 4,957,710, Cl. 422-171.000.

Kabushiki Kaisha Toyota Chuo Kenkusho: *See*—
Matsumoto, Shinichi; Tanaka, Toru; Ishikawa, Yutaka; Matsuura, Shinji; Shinjoh, Hirofumi; and Ozawa, Masakuni, 4,957,896, Cl. 502-304.000.

Kabushiki Kaisha Toyota Chuo Kenkyusho: *See*—
Komazawa, Osamu; Isogai, Shigetaka; Buma, Shuuichi; Onuma, Toshio; Yonekawa, Takashi; and Hattori, Katsuhiko, 4,957,309, Cl. 280-707.000.

Kabushiki Kaisha Yakult Honsha: *See*—
Kan, Tatsuhiko; and Kobayashi, Yoichi, 4,957,860, Cl. 435-101.000.
Saita, Taketsugu; and Shindo, Junko, 4,957,763, Cl. 426-548.000.

Kachuk, Paul T., to Flint & Walling, Inc. Governor and motor assembly. 4,958,096, Cl. 310-68.00E.

Kada, Katsuhiko: *See*—
Kobayashi, Junya; Oota, Masaaki; Kada, Katsuhiko; and Minakuchi, Hiroyoshi, 4,957,883, Cl. 501-35.000.

Kadokura, Sadao; Kamei, Kazuhiro; and Watamura, Yoshihisa, to Teijin Limited. Magnetic recording disk cartridge. 4,958,249, Cl. 360-133.000.

Kadow, John F.; and Vyas, Dolatrai M., to Bristol-Myers Company. Epipodophyllotoxin glucoside lactam derivatives. 4,958,010, Cl. 536-17.200.

Kadowaki, Toshihiro, to Ganon Kabushiki Kaisha. Color image forming apparatus. 4,958,219, Cl. 358-75.000.

Kadowaki, Yukio; Matsuoka, Shigeki; and Nakamura, Shogo, to Ricoh Company, Ltd. Composite finite impulse response digital filter. 4,958,311, Cl. 364-724.010.

Kageyama, Hidehei; Mitsuya, Yoshihide; and Nakazato, Yonichi, to Kotobuki & Co., Ltd. Mechanical pencil. 4,957,384, Cl. 401-65.000.

Kahonen, Matti. Action for a wind instrument. 4,957,029, Cl. 84-384.000.

Kai, Seiichi: *See*—
Minai, Masayoshi; Ueda, Yuji; Higashii, Takayuki; Kondo, Michitada; and Kai, Seiichi, 4,957,867, Cl. 435-280.000.

Kaieda, Shozo; and Okajima, Hideo, to Kentek Information Systems, Inc. Transferring device and an image forming apparatus. 4,958,194, Cl. 355-277.000.

Kaji, Reiichi: *See*—
Ohkawa, Tsuyoshi; and Kaji, Reiichi, 4,957,078, Cl. 123-90.310.

Kakizawa, Koichiro; and Ichihashi, Tadashi, to Kowa Company Ltd. Ophthalmic disease detection apparatus. 4,957,360, Cl. 351-221.000.

Kako, Hiroyoshi: *See*—
Morikawa, Hirohiko; Kako, Hiroyoshi; Noguchi, Noboru; and Nakanishi, Nobuyasu, 4,957,330, Cl. 303-115.000.

Kalafirov, Hristo A.: *See*—
Dimitrov, Dimiter A.; Dakov, Mincho S.; Tonchev, Dancho T.; Kalafirov, Hristo A.; Botev, Todor S.; Shterev, Krassimir E.; Kojuharov, Vladimir S.; Dimitrov, Yordan I.; and Tzvetkov, Dimiter V., 4,957,529, Cl. 65-112.000.

Kalany, Robert M.: *See*—
Jones, Wickliffe, deceased; Scarpa, Eric W.; Greenwell, Joseph D.; Nease, Mark R.; Kalany, Robert M.; and Myers, Michael E., 4,956,964, Cl. 53-570.000.

Kalisher, Sheila L. Tackle box belt. 4,957,231, Cl. 224-151.000.

Kamada, Masayasu; Maeda, Toshihisa; Kobayashi, Tadashi; and Shimizu, Goro, to Matsui Shikiso Chemical Co., Ltd. Thermochromic color masterbatch. 4,957,949, Cl. 523-201.000.

Kamarei, Ahmad R.; Catsimpoolas, Nicholas; McCluer, Robert; Mise, Takashi; and Sinn, Robert S., to Angio-Medical Corp. Method for the treatment of gastric ulcer. 4,957,741, Cl. 424-551.000.

Kamata, Kazuo: *See*—
Komatsuzaki, Hiroshi; Kamata, Kazuo; Ohniya, Akio; Nishimura, Syunji; Umeda, Yoshihito; Mochizuki, Noriya; and Furuya, Eiji, 4,958,179, Cl. 354-195.120.

Kamaya Kagaku Kogyo Co., Ltd.: *See*—
Kobayashi, Hidenori; Suwabe, Moriaki; Inakazu, Nobuhiro; and Nagamatsu, Hatsuo, 4,957,682, Cl. 264-255.000.

Kamei, Kazuhiro: *See*—
Kadokura, Sadao; Kamei, Kazuhiro; and Watamura, Yoshihisa, 4,958,249, Cl. 360-133.000.

Kameyama, Yutaka: *See*—
Torii, Sigeru; Tanaka, Hideo; Taniguchi, Masatoshi; Sasaoka, Michio; Saito, Norio; Shiroi, Takashi; Nagao, Shigemitsu; Kikuchi, Ryo; and Kameyama, Yutaka, 4,958,018, Cl. 340-215.000.

Kamijo, Hiroyuki: *See*—
Usami, Toshiro; Kamijo, Hiroyuki; Ohta, Takao; and Ogino, Masanobu, 4,958,373, Cl. 382-8.000.

Kamijyo, Tetsuo: *See*—
Yasuda, Keiji; Kamijyo, Tetsuo; and Miyahara, Kazuhiro, 4,957,374, Cl. 374-142.000.

Kaminski, Stanley S.: *See*—
Maranci, Arlun; Peake, Steven L.; and Kaminski, Stanley S., 4,957,801, Cl. 428-147.000.

Kamio, Kunimasa: *See*—
Saito, Yasuhisa; Watanabe, Katsuya; Okuno, Kohichi; Kamio, Kunimasa; and Morii, Akira, 4,957,995, Cl. 528-99.000.

Kamiya, Osamu; and Fujiyama, Yasutomo, to Canon Kabushiki Kaisha. Photographing apparatus. 4,958,185, Cl. 354-478.000.

Kamiya, Osamu: *See*—
Ando, Kenji; Kamiya, Osamu; Sugata, Masao; Kurihara, Noriko; Sugata, Hiroyuki; Den, Tohru; Kimura, Toshiaki; Hamamoto, Takashi; Haruta, Masahiro; and Osabe, Kuniji, 4,957,061, Cl. 118-719.000.

Kamo, Mutsukazu: *See*—
Sato, Yoichiro; Kamo, Mutsukazu; and Hata, Chiemi, 4,957,591, Cl. 156-643.000.

Kamuro, Yasuo: *See*—
Teraji, Tsutomu; Yamamura, Atsushi; Kamuro, Yasuo; Hirai, Koichi; and Fujii, Seiichi, 4,957,537, Cl. 71-95.000.

Kan, Sato: *See*—
Shizuo, Yokohori; Kenzo, Miyamoto; Koji, Fukushima; Masami, Tsujimoto; Kenji, Onda; and Kan, Sato, 4,957,792, Cl. 428-36.200.

Kan, Tatsuhiko; and Kobayashi, Yoichi, to Yakubushiki Kaisha Yakult Honsha. Method for producing oligosaccharide. 4,957,860, Cl. 435-101.000.

Kanagaki, Toshikuni; Hashimoto, Minoru; Iwai, Shougo; and Nishijima, Masaru, to Sharp Kabushiki Kaisha. Shredder. 4,957,243, Cl. 241-34.000.

Kanamaru, Mitsutaka: *See*—
Nakashima, Mitsuyoshi; Kanamaru, Mitsutaka; Sugiyama, Akira; Terakawa, Masato; Ono, Takaharu; and Horiai, Haruo, 4,957,923, Cl. 514-259.000.

Kanda, Kazunori: *See*—
Kusuda, Hidefumi; Konishi, Katsuji; and Kanda, Kazunori, 4,957,850, Cl. 430-271.000.

Kanegae, Masatomo; Kogano, Takayoshi; and Ito, Fumio, to Hitachi, Ltd.; Hitachi VLSI Engineering Corp.; and Hitachi Tokyo Electronics Co. Processing apparatus. 4,957,781, Cl. 427-255.300.

Kaneko, Kenji: *See*—
Kiuchi, Atsushi; Kaneko, Kenji; Ishida, Jun; Nakagawa, Tetsuya; Hagiwara, Yoshimune; Akazawa, Takashi; and Sato, Tomoru, 4,958,276, Cl. 364-200.000.

Kaneko, Kuniya; Wakiyama, Harumichi; Naito, Tadashi; and Ando, Toshihiro, to Toyota Jidosha Kabushiki Kaisha. Production control system for mixed production line. 4,958,292, Cl. 364-468.000.

Kaneko, Noriaki; Hirata, Yoshimi; and Moriwaki, Masahiro, to Ube Industries, Ltd. Medical tubes. 4,957,508, Cl. 623-12.000.

Kanema, Seiichi; Nio, Misato; Fukunaga, Yasushi; and Nishida, Takehiko, to Hitachi, Ltd. Graphic display processing system and displayed pattern picking method used in the same. 4,958,147, Cl. 340-706.000.

Kannankeril, Charles P., to Sealed Air Corporation. Laminated sheet for protecting underground vertical walls. 4,956,951, Cl. 52-169.500.

Kanno, Yoshiaki: *See*—
Sasaki, Takeo; and Kanno, Yoshiaki, 4,957,086, Cl. 123-478.000.

Kano, Takenori; Takemoto, Haruki; Niimi, Mamoru; Takase, Isao; and Yokoyama, Fumitomo, to Aisin AW Co., Ltd. Hydraulic device for an automatic transmission. 4,957,195, Cl. 192-106.00F.

Kanou, Noboru: *See*—
Okamura, Naokatsu; Yamaguchi, Noboru; Masuda, Shuji; and Kanou, Noboru, 4,956,983, Cl. 70-241.000.

Kanshin, Nikolaevich N.: *See*—
Lipatov, Viktor A.; Guskov, Igor A.; and Kanshin, Nikolaevich N., 4,957,499, Cl. 606-153.000.

Kantner, Hugh B.; and Spector, George. Putter pool billiard game. 4,957,288, Cl. 273-2.000.

Kantor, Karen D. Toilet roll cover. 4,957,246, Cl. 242-55.530.

Kao Corporation: *See*—
Inoue, Takeshi; Hikichi, Tadasu; Fukuyama, Yukihiro; and Kondo, Akihiro, 4,957,992, Cl. 526-324.000.
Kinashi, Hiroshi; Kawabata, Itaru; Yamane, Hidenobu; Tsujimoto, Yoshiharu; Gotoh, Shinya; and Nawa, Masayoshi, 4,958,197, Cl. 355-299.000.

Kapoor, Mohan L.: *See*—
Young, Edward L.; and Kapoor, Mohan L., 4,958,105, Cl. 315-169.300.

Karami, Yusuke: *See*—
Doi, Shinji; Yoshida, Satoshi; Matsunaga, Satoshi; Kawakami, Hiroaki; Kasuya, Takashige; Goseki, Yasuhide; and Karami, Yusuke, 4,957,774, Cl. 427-45.100.

Karapetian, Vadim K.: *See*—
Denisov, Vladimir F.; Gertseva, Marina I.; Ziberov, Valentin E.; Karapetian, Vadim K.; Sarkisian, Norik S.; Karbachinsky, Vladimir M.; Kharlamov, Oleg I.; Tsoi, Alexei D.; Tsysin, Mark I.; Romanov, Alexei A.; Veranian, Vagan D.; Khripin, Vasily D.; and Shafran, Larisa E., 4,957,512, Cl. 55-8.000.

Karbachinsky, Vladimir M.: *See*—
Denisov, Vladimir F.; Gertseva, Marina I.; Ziberov, Valentin E.; Karapetian, Vadim K.; Sarkisian, Norik S.; Karbachinsky, Vladimir M.; Kharlamov, Oleg I.; Tsoi, Alexei D.; Tsysin, Mark I.; Romanov, Alexei A.; Veranian, Vagan D.; Khripin, Vasily D.; and Shafran, Larisa E., 4,957,512, Cl. 55-8.000.

Karch, John A.: *See*—
Yoo, Jin S.; Karch, John A.; Bhattacharyya, Alakananda A.; and Radlowski, Cecelia A., 4,957,718, Cl. 423-244.000.
Karp, John D. K. Pickup truck pads for carrying long loads. 4,957,400, Cl. 410-110.000.
Kasahara, Izumi: *See*—
Tokita, Masakazu; and Kasahara, Izumi, 4,958,374, Cl. 382-8.000.
Kasahara, Senshi: *See*—
Taga, Toshiyuki; and Kasehara, Senshi, 4,957,719, Cl. 423-328.000.
Kasai, Yuji: *See*—
Shiojima, Kenji; and Kasai, Yuji, 4,957,196, Cl. 194-239.000.
Kashida, Motokazu: *See*—
Kozuki, Suzumu; Takimoto, Hiroyuki; Kashida, Motokazu; Takahashi, Koji; and Nagasawa, Kenichi, 4,958,246, Cl. 360-77.150.
Kashiwagi, Hiroshi: *See*—
Tamura, Kohji; Kashiwagi, Hiroshi; and Noguchi, Masahiro, 4,957,652, Cl. 252-67.000.
Kasuya, Takashige: *See*—
Doi, Shinji; Yoshida, Satoshi; Matsunaga, Satoshi; Kawakami, Hiroaki; Kasuya, Takashige; Goseki, Yasuhide; and Karami, Yusuke, 4,957,774, Cl. 427-45.100.
Katayama, Akihiro; and Ohsawa, Hidefumi, to Canon Kabushiki Kaisha. Image processing method and apparatus with dot-processing. 4,958,218, Cl. 358-75.000.
Katayama, Akihiro; and Ohsawa, Hidefumi, to Canon Kabushiki Kaisha. Image processing method and apparatus with conditional correction of error data. 4,958,238, Cl. 358-456.000.
Katayama, Akihiro: *See*—
Nagashima, Nao; Ichikawa, Hiroyuki; and Katayama, Akihiro, 4,958,236, Cl. 358-445.000.
Kato, Hidetoshi: *See*—
Shibata, Hiroshi; Machara, Fuyuki; Shintai, Akira; and Kato, Hidetoshi, 4,957,876, Cl. 437-209.000.
Kato, Ichiro, to Canon Kabushiki Kaisha. Communication apparatus. 4,958,339, Cl. 375-1.000.
Kato, Masayuki: *See*—
Hasegawa, Shin-ya; Kato, Masayuki; Yamagishi, Fumio; Ikeda, Hiroyuki; and Inagaki, Takefumi, 4,957,336, Cl. 350-3.710.
Kato, Takatsugu: *See*—
Takahashi, Takao; Kato, Takatsugu; and Terushima, Shigero, 4,957,143, Cl. 139-190.000.
Kato, Toshikazu: *See*—
Tomagou, Satoshi; Kato, Toshikazu; Inoue, Hiroshi; and Ogawara, Kensuke, 4,958,003, Cl. 528-364.000.
Kato, Yoshiaki: *See*—
Nakagawa, Susumu; Murase, Satoshi; Ushijima, Ryosuke; and Kato, Yoshiaki, 4,958,029, Cl. 548-430.000.
Katoh, Naoyuki; Aoki, Masahiro; and Tsukamoto, Takeo, to Mitsubishi Yuka Badische Co., Ltd. Process for producing composite laminate comprising insert part and injection-molded part. 4,957,677, Cl. 264-135.000.
Katoh, Yoshihisa; Ogawa, Takashi; Hasegawa, Mitsumasa; Fujimoto, Masashi; and Hayashi, Masaaki, to Toshiba Ceramics Co. Ltd. Ceramic filter modules in series with piston backwash. 4,957,625, Cl. 210-119.000.
Katoh, Yoshinori: *See*—
Yamamoto, Hidetoshi; Gotoh, Taiji; and Katoh, Yoshinori, 4,956,904, Cl. 29-237.000.
Katsuma, Makoto: *See*—
Kimura, Hiroyuki; Kobayashi, Takeshi; Katsuma, Makoto; Urushihara, Kazunobu; Matsumura, Susumu; and Ohmura, Hiroshi, 4,958,217, Cl. 358-75.000.
Katsuyama, Toshio: *See*—
Ogawa, Kensuke; Katsuyama, Toshio; and Fukuzawa, Tadashi, 4,957,337, Cl. 350-96.130.
Katzenstein, Leo R.: *See*—
Abramovici, Gabriela M.; Buhrke, Rolfe E.; Chandramouli, Bopsi; Dianda, Robert B.; Katzenstein, Leo R.; O'Connor, Thomas M.; Rinker, Timothy G.; and Tripp, Susan J., 4,958,343, Cl. 370-85.100.
Kaubek, Fritz: *See*—
Maier-Laxhuber, Peter; and Kaubek, Fritz, 4,956,977, Cl. 62-106.000.
Kawabata, Itaru: *See*—
Kinashi, Hiroshi; Kawabata, Itaru; Yamane, Hidenobu; Tsujimoto, Yoshiharu; Gotoh, Shinya; and Nawa, Masayoshi, 4,958,197, Cl. 355-299.000.
Kawagoe, Takahiro: *See*—
Daifuku, Hideharu; Kitamura, Takashi; and Kawagoe, Takahiro, 4,957,833, Cl. 429-197.000.
Kawahara, Haruyuki; Tsukamoto, Seiichi; Nomura, Yutaka; Tanaka, Katsumi; Ashiura, Yasuyuki; and Yoshimura, Motonobu, to Haruyuki Kawahara; and Toho Titanium Co., Ltd. Frameless and coreless porous endosseous implant. 4,957,819, Cl. 428-547.000.
Kawai Musical Instruments Mfg. Co., Ltd.: *See*—
Suzuki, Isao, 4,957,030, Cl. 84-604.000.
Kawai, Noboyuki: *See*—
Yamada, Takanobu; Kawai, Noboyuki; and Kinoshita, Takeru, 4,958,191, Cl. 355-245.000.
Kawakami, Hiroaki: *See*—
Doi, Shinji; Yoshida, Satoshi; Matsunaga, Satoshi; Kawakami, Hiroaki; Kasuya, Takashige; Goseki, Yasuhide; and Karami, Yusuke, 4,957,774, Cl. 427-45.100.
Kawamura, Ken: *See*—
Isono, Masanao; Kawamura, Ken; Asano, Masaya; Suzuki, Tetuo; and Abiko, Shigeo, 4,957,845, Cl. 430-156.000.
Kawamura, Kunio: *See*—
Ishikawa, Norio; Nakai, Masaaki; Hirano, Masayasu; Fujino, Akihiko; Ootsuka, Hiroshi; Egawa, Takeshi; and Kawamura, Kunio, 4,958,181, Cl. 354-412.000.
Izumi, Shuji; Nakai, Masaaki; Inoue, Manabu; Fujino, Akihiko; Kawamura, Kunio; Takarabe, Yuji; and Niwa, Masatake, 4,958,184, Cl. 354-474.000.
Kawamura, Michio; Shimada, Yasunori; Inoshita, Koichi; Yoshida, Shozo; Kawanabe, Toshiaki; Hattori, Haruo; Doi, Yukio; and Awano, Mamoru, to Taio Paper Manufacturing Co., Ltd.; and Showa High Polymer Co., Ltd. Method of producing a slurry of microcapsules. 4,957,666, Cl. 264-4.700.
Kawanabe, Toshiaki: *See*—
Kawamura, Michio; Shimada, Yasunori; Inoshita, Koichi; Yoshida, Shozo; Kawanabe, Toshiaki; Hattori, Haruo; Doi, Yukio; and Awano, Mamoru, 4,957,666, Cl. 264-4.700.
Kawano, Nobuyuki: *See*—
Miyamura, Masashi; and Kawano, Nobuyuki, 4,956,898, Cl. 24-274.00R.
Kawazoe, Shigemi: *See*—
Okumura, Ryozo; Terada, Eiichi; and Kawazoe, Shigemi, 4,957,964, Cl. 525-64.000.
Kawneer Company, Inc.: *See*—
Touton, Charles P., III, 4,956,940, Cl. 49-388.000.
Kay, John A.: *See*—
Holsapple, Ronald L.; and Kay, John A., 4,957,970, Cl. 525-99.000.
Keldany, Rachid; and Shaw, Keith J., to Ametex AG. Apparatus for producing a wound plastic tube. 4,957,586, Cl. 156-428.000.
Keller, Helmut. Method for treating herpes. 4,957,743, Cl. 424-195.100.
Keller, Lewis C.; and Bowles, Cecil A., to Fritto-Lay Inc. Dielectric drying of hot plastic food extrudate. 4,958,054, Cl. 219-10.55M.
Kelly Company Inc.: *See*—
Carlson, Dennis L.; and Cultice, Richard D., Jr., 4,957,600, Cl. 160-199.000.
Kemper, Alicia W., to Innovec, Inc. Space definer for use on horizontal surfaces. 4,957,262, Cl. 248-460.000.
Kemper, Yves J., to Tractiontec Corporation. Traction drive transmission system. 4,957,474, Cl. 475-279.000.
Kendall, Paul W.; and Parrott, Gregory H., to Accu Industries, Inc. Balancer. 4,958,290, Cl. 364-463.000.
Kenji, Onda: *See*—
Shizuo, Yokohori; Kenzo, Miyamoto; Koji, Fukushima; Masami, Tsujimoto; Kenji, Onda; and Kan, Sato, 4,957,792, Cl. 428-36.200.
Kennametal Inc.: *See*—
Niebauer, Kenneth L., 4,957,396, Cl. 407-114.000.
Kennedy, David R.: *See*—
Thorncraft, David A.; Kennedy, David R.; Rashleigh, Scott C.; and Dabbs, Timothy P., 4,957,338, Cl. 350-96.150.
Kennis, Ludo E. J.; Vandenberk, Jan; and Mertens, Josephus C., to Janssen Pharmaceutica N.V. Antipsychotic 3-piperazinylbenzazole derivatives. 4,957,916, Cl. 514-254.000.
Kentek Information Systems, Inc.: *See*—
Kaieda, Shozo; and Okajima, Hideo, 4,958,194, Cl. 355-277.000.
Kenzo, Miyamoto: *See*—
Shizuo, Yokohori; Kenzo, Miyamoto; Koji, Fukushima; Masami, Tsujimoto; Kenji, Onda; and Kan, Sato, 4,957,792, Cl. 428-36.200.
Kerkenaar, Antonius; Schmedding, Diederik J. M.; and Van Den Dool, Ronald T. M., to Nederlandse Organisatie Voor Toegepast-Natuurwetenschappelijk Onderzoek Tno. Bifunctional oligosaccharides and also active compounds derived therefrom. 4,958,016, Cl. 536-123.000.
Kerkman, Russel J.; and Seibel, Brian J., to Allen-Bradley Company, Inc. Frequency control based on sensing voltage fed to an induction motor. 4,958,117, Cl. 318-805.000.
Kern & Co. AG: *See*—
Hoffmann, Dieter, 4,957,375, Cl. 384-247.000.
Kern, Matthew F.: *See*—
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Aden, Gary D., 4,957,835, Cl. 430-5.000.
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Khatanzeisky, Egor V.: *See*—
Boguslavsky, Alexandr M.; Semenikhin, Viktor F.; Chergikalo, Vladimir I.; Rozenman, Lev I.; Tregub, Yakov K.; Risman, Arkady I.; Topopolsky, Yankel M.; Khatanzeisky, Egor V.; and Rubin, Eduard A., 4,957,058, Cl. 118-323.000.
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Powell, Joseph P.; Bender, Donald L.; Saunders, Sam C.; Purnell, Larry W.; and Khattak, Anwar S., 4,958,306, Cl. 364-550.000.

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Torii, Sigeru; Tanaka, Hideo; Taniguchi, Masatoshi; Sasaoka, Michio; Saito, Norio; Shiroi, Takashi; Nagao, Shigemitsu; Kikuchi, Ryo; and Kameyama, Yutaka, 4,958,018, Cl. 540-215.000.

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Spencer, James T.; Dowben, Peter A.; and Kim, Yoon G., 4,957,773, Cl. 427-39.000.

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Grier-Idris, Carletta, 4,957,120, Cl. 128-849.000.

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Ando, Kenji; Kamiya, Osamu; Sugata, Masao; Kurihara, Noriko; Sugata, Hiroyuki; Den, Tohru; Kimura, Toshiaki; Hamamoto, Takashi; Haruta, Masahiro; and Osabe, Kuniji, 4,957,061, Cl. 118-719.000.

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King, Norman R.: *See*—
Jacobs, Cornelis A.; King, Norman R.; and Bradham, Dale E., 4,958,103, Cl. 313-25.000.

Kinnan, Frank R., to Underground Technologies, Inc. Method and apparatus for subsoil drilling. 4,957,173, Cl. 175-61.000.

Kinney, William A.; and Lee, Nancy E., to American Home Products Corporation. 2-pyridinecarbothioamides, processes for preparation thereof and pharmaceutical compositions comprising the same. 4,958,023, Cl. 544-58.600.

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Obayashi, Atsushi; Takeda, Yuji; and Kinoshita, Kazuya, 4,957,818, Cl. 428-451.000.

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Tamari, Nobuyuki; Kondoh, Isao; and Kinoshita, Nakoto, 4,957,509, Cl. 623-16.000.

Kinoshita, Takeru: *See*—
Yamada, Takanobu; Kawai, Noboyuki; and Kinoshita, Takeru, 4,958,191, Cl. 355-245.000.

Kinzer, Kevin E.: *See*—
McAllister, Jerome W.; Kinzer, Kevin E.; Mrozinski, James S.; Johnson, Eric J.; and Dyrad, James F., 4,957,943, Cl. 521-64.000.

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Kirk, Karl L., to Emerson Electric Co. Portable drain cleaning apparatus. 4,956,889, Cl. 15-104.330.

Kirkby, Paul A., to STC PLC. Synchronous multifrequency optical network. 4,957,340, Cl. 350-96.160.

Kirkpatrick, Paul A.: *See*—
Hood, James A.; and Kirkpatrick, Paul A., 4,957,274, Cl. 251-129.120.

Kirkpatrick, Robert D., to Image Recognition Equipment Corporation. Bar code locator for video scanner/reader system. 4,958,064, Cl. 235-384.000.

Kishino, Kohji: *See*—
Yamada, Kiyoshige; Mizuma, Takashi; and Kishino, Kohji, 4,956,943, Cl. 49-503.000.

Kissinger, Robert D.: *See*—
Krueger, Daniel D.; Kissinger, Robert D.; Meazies, Richard G.; and Wukusick, Carl S., 4,957,567, Cl. 148-12.70N.

Kist, William J., to Combined Fluid Products Co. Vacuum system for feeding sheets. 4,957,283, Cl. 271-90.000.

Kitahiro, Isamu: *See*—
Takeda, Mamoru; Yamashita, Ichiro; and Kitahiro, Isamu, 4,958,205, Cl. 357-23.700.

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Daifuku, Hideharu; Kitamura, Takashi; and Kawagoe, Takahiro, 4,957,833, Cl. 429-197.000.

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Munk, Werner G.; Klecker, Manfred; and Haas, Franz, 4,957,754, Cl. 426-138.000.

Klee, Mareike K.: *See*—
Brand, Hans-Wolfgang; Hennings, Detlef F. K.; Klee, Mareike K.; and Scheinemacher, Herbert J., 4,957,888, Cl. 501-134.000.

Klein, Georg D.; and Carter, Frank E. T-nut with furrows. 4,957,402, Cl. 411-84.000.

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Oppenlander, Harry; and Druzela, Heiko, 4,957,327, Cl. 299-11.000.

Kluger, Patrick. Device for setting the spinal column. 4,957,495, Cl. 606-58.000.

Klumpp, Rolf: *See*—
Wagner, Wolf-Dietrich; Springer, Willi; Meissner, Ludwig; Bonfert, Helmut; Bottcher, Michael; Hardt, Thomas; Klumpp, Rolf; Krause, Klaus; Peters, Arndt; Plattner, Ernst; Strobel, Wolfgang; Waller, Wolfgang; and Wiemann, Gunter, 4,957,068, Cl. 123-41.82R.

Knapp, Alfons, to Masco Corporation. Mixing valve with valve plates provided with an attachment mechanism for the fixed plate to provide a compressive force. 4,957,135, Cl. 137-454.600.

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Herzog, Ludwig; and Knapp, Volker, 4,957,100, Cl. 128-24.00A.

Knauff, Robert J. Synchronized pulse-enhanced dual light source. 4,958,143, Cl. 340-479.000.

Kniesel, Ulrich. Apparatus for setting marker plugs. 4,957,391, Cl. 404-94.000.

Knight, Peter E.; and Lyons, John E., to Swish Products Limited. Cord tensioning device. 4,957,152, Cl. 160-345.000.

Knighton, David R., to University of Minnesota, Regents of the. Method for promoting hair growth. 4,957,742, Cl. 424-532.000.

Knodle, Daniel W.: *See*—
Mace, Leslie E.; Knodle, Daniel W.; Labuda, Lawrence L.; and Nuzzo, Philip F., 4,958,075, Cl. 250-343.000.

Knoll AG: *See*—
Rosenberg, Joerg; Heberger, Juergen; Gruenhagen, Hans-Heinrich; Brode, Egon; and von Philipsborn, Gerda, 4,958,046, Cl. 560-142.000.

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Knudsen, Arne K.; and Rafaniello, William, to Dow Chemical Company, The. Titanium diboride/boron carbide composites with high hardness and toughness. 4,957,884, Cl. 501-87.000.

Knudsen, Christopher G.; and Michaely, William J., to ICI Americas Inc. Certain substituted 3-(substituted oxy)-2-benzoyl-cyclohex-2-enones. 4,957,540, Cl. 71-123.000.

Knyazeva, Tatyana N.: *See*—
Ivanova, Lilia N.; Rozhkova, Irina V.; Semenikhina, Vera F.; Knyazeva, Tatyana N.; and Chagarovsky, Alexandr P., 4,957,752, Cl. 426-43.000.

Koaladesign S.r.L.: *See*—
Vandini, Aldo, 4,956,957, Cl. 52-584.000.

Kobata, Makoto: *See*—
Sudo, Ryoichi; Kobata, Makoto; Miwa, Hiroaki; and Tajima, Tetsuo, 4,957,990, Cl. 526-282.000.

Kobayashi, Hidenori; Suwabe, Moriaki; Inakazu, Nobuhiro; and Nagamatsu, Hatsuo, to Kamaya Kagaku Kogyo Co., Ltd. Method of injection molding a three-layered container. 4,957,682, Cl. 264-255.000.

Kobayashi, Hidetoshi; and Nishikawa, Toshihiro, to Fuji Photo Film Co., Ltd. Silver halide color photographic light-sensitive material containing cyan coupler and method for use thereof. 4,957,853, Cl. 430-384.000.

Kobayashi, Hironobu, to Kabushiki Kaisha Toshiba. Method of and apparatus for converting attributes of display data into desired colors in accordance with relation. 4,958,301, Cl. 364-521.000.

Kobayashi, Hitoshi: *See*—
Nakatomi, Yoshiyuki; Iwasa, Toshirou; and Kobayashi, Hitoshi, 4,958,067, Cl. 250-221.000.

Kobayashi, Junya; Oota, Masaaki; Kada, Katsuhiko; and Minakuchi, Hiroyoshi, to Shimadzu Corporation. Oxynitride glass and the fiber thereof. 4,957,883, Cl. 501-35.000.

Kobayashi, Kazuo: *See*—
Terada, Yasushi; Kobayashi, Kazuo; and Nakayama, Takeshi, 4,958,317, Cl. 365-104.000.

Kobayashi, Kenzo; and Shiroishi, Hirokazu, to Furukawa Electric Co., Ltd., The. Molded circuit board. 4,958,260, Cl. 361-398.000.

Kobayashi, Shigeo; Hiramatsu, Toshio; Yamamoto, Katsumasa; and Ichikawa, Nobuhiko, to Toyo Boseki Kabushiki Kaisha. Polyester resin composition and hollow molded article thereof. 4,957,980, Cl. 525-425.000.

Kobayashi, Shinichi: *See*—
Noguchi, Kenji; Toyama, Tsuyoshi; Kobayashi, Shinichi; Andoh, Nobuaki; and Kohda, Kenji, 4,958,352, Cl. 371-40.100.

Kobayashi, Shozou: *See*—
Yamanaka, Toshihiro; Horie, Nobuyuki; Kobayashi, Shozou; Deguchi, Toshihisa; Yamaguchi, Takeshi; Maeda, Shigemi; Nishioka, Yoshiki; and Sugiura, Teruki, 4,958,337, Cl. 369-58.000.

Kobayashi, Tadashi: *See*—
Kamada, Masayasu; Maeda, Toshihisa; Kobayashi, Tadashi; and Shimizu, Goro, 4,957,949, Cl. 523-201.000.

Kobayashi, Takeshi: *See*—
Kimura, Hiroyuki; Kobayashi, Takeshi; Katsuma, Makoto; Urushihara, Kazunobu; Matsumura, Susumu; and Ohmura, Hiroshi, 4,958,217, Cl. 358-75.000.

Kobayashi, Toshio, to Asahi Corporation. Toy-game device. 4,957,287, Cl. 273-1.099.

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Kan, Tatsuhiko; and Kobayashi, Yoichi, 4,957,860, Cl. 435-101.000.

Koch, Mark B.: *See*—
Zemel, Haya; and Koch, Mark B., 4,958,015, Cl. 536-103.000.

Koever, Laszlo; Rittersdorf, Walter; and Werner, Wolfgang, to Boehringer Mannheim GmbH. Method for the determination of redox reactions using iodate to eliminate asorbic acid interference. 4,957,872, Cl. 436-175.000.

Koga, Genji: *See*—
Imatani, Katsuo; Yamamoto, Shinichirou; and Koga, Genji, 4,958,002, Cl. 528-353.000.

Kogano, Takayoshi: *See*—
Kanegae, Masatomo; Kogano, Takayoshi; and Ito, Fumio, 4,957,781, Cl. 427-255.300.

Kohda, Kenji: *See*—
Noguchi, Kenji; Toyama, Tsuyoshi; Kobayashi, Shinichi; Andoh, Nobuaki; and Kohda, Kenji, 4,958,352, Cl. 371-40.100.

Kohler, Rolf-Dieter: *See*—
Hagen, Helmut; Kohler, Rolf-Dieter; and Dupuis, Jacques, 4,957,608, Cl. 204-157.710.

Kohlert, Dieter: *See*—
von Basse, Paul-Werner; Dortu, Jean-Marc; Herlitzek, Andrea; Kohlert, Dieter; and Schaper, Ulrich, 4,958,319, Cl. 365-154.000.

Kohlin, Ronald A.: *See*—
Firth, Rowland V. D., III; Hunter, Quay C., Jr.; Kohlin, Ronald A.; and Sitton, William W., 4,958,195, Cl. 355-290.000.

Kohno, Yoshihiro; and Iida, Kazumi, to Yamaha Hatsudoki Kabushiki Kaisha; and Sanshin Kogyo Kabushiki Kaisha. Apparatus for injecting an accelerating fuel. 4,957,664, Cl. 261-34.200.

Koike, Masahiko: *See*—
Hirano, Katsuhiko; Koike, Masahiko; and Toda, Hiroyuki, 4,957,032, Cl. 84-622.000.

Koike, Shoji; and Tomida, Yasuko, to Canon Kabushiki Kaisha. Ink for ink-jet recording and ink-jet recording process employing the same. 4,957,553, Cl. 106-20.000.

Koishi, Musubu; Aoshima, Shinichiro; and Tsuchiya, Yutaka, to Hamamatsu Photonics Kabushiki Kaisha. Multi-channel voltage detector. 4,958,124, Cl. 324-96.000.

Koito Manufacturing Co., Ltd.: *See*—
Horiuchi, Kazuya; Uchida, Kihachiro; Harada, Tadashi; and Izawa, Takeshi, 4,957,455, Cl. 439-548.000.

Koji, Fukushima: *See*—
Shizuo, Yokohori; Kenzo, Miyamoto; Koji, Fukushima; Masami, Tsujimoto; Kenji, Onda; and Kan, Sato, 4,957,792, Cl. 428-36.200.

Kojima, Mitsumasa: *See*—
Kikuchi, Tohru; Fujita, Toshiyuki; Saito, Takayuki; Kojima, Mitsumasa; Sato, Hidetaka; and Suzuki, Hiroshi, 4,958,001, Cl. 528-346.000.

Kojima, Narihito: *See*—
Rokutanzono, Takashi; Ide, Yukio; Nagame, Hiroshi; Ohshima, Kouichi; Kojima, Narihito; and Nosho, Shinji, 4,957,839, Cl. 430-66.000.

Kojima, Shinjiro; Matsuda, Hideo; Iwasaki, Masami; and Uetake, Yoshinari, to Kabushiki Kaisha Toshiba. Press-contact flat type semiconductor device. 4,958,215, Cl. 357-79.000.

Kojuharov, Vladimir S.: *See*—
Dimitrov, Dimiter A.; Dakov, Mincho S.; Tonchev, Dancho T.; Kalafirov, Hristo A.; Botev, Todor S.; Shterev, Krassimir E.; Kojuharov, Vladimir S.; Dimitrov, Yordan I.; and Tzvetkov, Dimiter V., 4,957,529, Cl. 65-112.000.

Kokusan Kinzoku Kogyo Kabushiki Kaisha: *See*—
Shiojima, Kenji; and Kasai, Yuji, 4,957,196, Cl. 194-239.000.

Koller, Otto: *See*—
von Bogdandy, Ludwig; Mitter, Gerhard; Koller, Otto; Pochmarski, Luzian; Jaquemar, Christian; and Langhammer, Hans-Jurgen, 4,957,547, Cl. 75-567.000.

Koma, Norihiko, to Nippon Kokan Kabushiki Kaisha. Offshore fish cage for farming fish. 4,957,064, Cl. 119-3.000.

Komai, Yukio: *See*—
Miyamoto, Jiro; Nakasai, Takashi; and Komai, Yukio, 4,957,799, Cl. 428-114.000.

Komatsuzaki, Hiroshi; Kamata, Kazuo; Ohmiya, Akio; Nishimura, Syunji; Umeda, Yoshihito; Mochizuki, Noriya; and Furuya, Eiji, to Fuji Photo Film Co., Ltd.; and Nihon Seimitsu Kogyo Kabushiki Kaisha. Camera with changeable focal length. 4,958,179, Cl. 354-195.120.

Komazawa, Osamu; Isogai, Shigetaka; Buma, Shuuichi; Onuma, Toshio; Yonekawa, Takashi; and Hattori, Katsuhiko, to Toyota Jidosha Kabushiki Kaisha; Kabushiki Kaisha Toyota Chuo Kenkyusho; and Aisin Seiki Kabushiki Kaisha. Pressure control system for suspension. 4,957,309, Cl. 280-707.000.

Komori, Takahiro: *See*—
Fujihara, Kazuo; and Komori, Takahiro, 4,957,036, Cl. 98-2.000.

Komura, Kenichi: *See*—
Sato, Tsuguo; and Komura, Kenichi, 4,957,343, Cl. 350-96.210.

Komura, Syoichi; and Toyofuku, Hiroyuki, to Sanko Senzai Kogyo Kabushiki Kaisha. Coil spring. 4,957,278, Cl. 267-166.000.

Kondo, Akihiro: *See*—
Inoue, Takeshi; Hikichi, Tadasu; Fukuyama, Yukihiro; and Kondo, Akihiro, 4,957,992, Cl. 526-324.000.

Kondo, Masao; and Abe, Yasunao, to Yamaha Corporation. Automatic music playing apparatus having plural tone generating channels separately assignable to the parts of a musical piece. 4,957,031, Cl. 84-613.000.

Kondo, Michitada;: *See*—
Minai, Masayoshi; Ueda, Yuji; Higashii, Takayuki; Kondo, Michitada;; and Kai, Seiichi, 4,957,867, Cl. 435-280.000.

Kondoh, Isao: *See*—
Tamari, Nobuyuki; Kondoh, Isao; and Kinoshita, Nakoto, 4,957,509, Cl. 623-16.000.

Konica Corporation: *See*—
Fujii, Masaki; Tamura, Hitoshi; Suzuki, Kuninori; and Hatakeyama, Noboru, 4,958,196, Cl. 355-298.000.
Nakamura, Masao; Sakamoto, Norio; and Ito, Takashi, 4,957,247, Cl. 242-67.10R.
Yamada, Yasushi, 4,957,285, Cl. 271-3.100.

Konishi, Katsuji: *See*—
Kusuda, Hidefumi; Konishi, Katsuji; and Kanda, Kazunori, 4,957,850, Cl. 430-271.000.

Konno, Tsuneo: *See*—
Inoue, Kazuo; Hanaoka, Takashi; and Konno, Tsuneo, 4,957,076, Cl. 123-90.160.

Kono, Nobuharu: *See*—
Takisawa, Yukihisa; Kono, Nobuharu; Saito, Kenji; and Yamachika, Hiroshi, 4,958,033, Cl. 549-59.000.

Koop, Donald A.: *See*—
Alessi, Paula J.; Faul, William H.; Giorgianni, Edward J.; Koop, Donald A.; and Madden, Thomas E., 4,958,220, Cl. 358-76.000.

Koralek, Richard: *See*—
Tanner, Robert M.; Koralek, Richard; Chethik, Frank; Lengel, Stephen B.; and Miller, David H., 4,958,349, Cl. 371-37.100.

Kordesch, Karl; Gaellmann, Josef; and Tomantschger, Klaus, to Battery Technologies Inc. Rechargeable alkaline manganese cells with zinc anodes. 4,957,827, Cl. 429-60.000.

Kordosky, Gary A.: *See*—
Olafson, Stephen M.; Lewis, Roy G.; and Kordosky, Gary A., 4,957,714, Cl. 423-24.000.

Korea Advanced Institute of Science and Technology: *See*—
Min, Suk K.; Park, Seung C.; and Han, Chul W., 4,957,711, Cl. 422-245.000.

Koriyama, Tsuyoshi: *See*—
Tokura, Seiichi; Koriyama, Tsuyoshi; Chiba, Yoshiyuki; and Satake, Mikio, 4,958,012, Cl. 536-20.000.

Koshi, Kiroyuki; Owada, Minoru; Minegishi, Hisako; and Ono, Takayuki, to Hitachi, Ltd. Fluorescence spectrophotometer and wavelength setting method therefor. 4,957,366, Cl. 356-318.000.

Koshiba, Mitsunobu; Harita, Yoshiyuki; Furuto, Yuuji; Roland, Bruno; and Lombaerts, Ria, to Japan Synthetic Rubber Co., Ltd.; and UCB Societe Anonyme. Method for high temperature reaction process. 4,957,588, Cl. 156-628.000.

Koshimoto, Naohide: *See*—
Nakatani, Shigeki; Koshimoto, Naohide; and Sugimoto, Hiroyuki, 4,957,079, Cl. 123-90.340.

Kosho, Akikazu: *See*—
Oku, Shungi; and Kosho, Akikazu, 4,958,050, Cl. 174-261.000.

Koskol, Joseph E.; Santucci, Robert J.; and Rosanio, Louis G., Jr., to Du Pont de Nemours, E. I., and Company. Apparatus and process for forming a wad of yarn. 4,956,901, Cl. 28-255.000.

Kosson, Julie S.; and McLennan, Michael J., to International Business Machines Corporation. Voltage clamping circuits with high current capability. 4,958,093, Cl. 307-540.000.

Kostopoulos, George P. Paint roller cover applicator cleaning apparatus. 4,957,127, Cl. 134-117.000.

Kostretsov, Anatoly S.: *See*—
Bukatov, Alexandr S.; Iofis, Naum A.; Egorov, Jury G.; Dobrova, Natalya B.; Kostretsov, Anatoly S.; and Agafonov, Andrei V., 4,957,503, Cl. 623-2.000.

Kosugi, Ryuichi; and Tabaru, Tsugio, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor pseudo memory module. 4,958,322, Cl. 365-189.010.

Kotlarz, Jeffery R. Ball return mechanism for a basketball game. 4,957,289, Cl. 273-1.50A.

Kotobuki & Co., Ltd.: *See*—
Kageyama, Hidehei; Mitsuya, Yoshihide; and Nakazato, Youichi, 4,957,384, Cl. 401-65.000.

Kotski, Edward J. Voltage isolation apparatus for service transformers. 4,958,250, Cl. 361-40.000.

Kowa Company Ltd.: *See*—
Kakizawa, Koichiro; and Ichihashi, Tadashi, 4,957,360, Cl. 351-221.000.

Koya, Keizo: *See*—
Takahashi, Osamu; Koyama, Koichi; and Koya, Keizo, 4,957,848, Cl. 430-203.000.

Koyama, Ikuo; and Ohata, Hajime, to Kabushiki Kaisha Toshiba. Optical card with increased data storage capacity and recording/reproducing apparatus therefor. 4,958,339, Cl. 369-98.000.

Koyama, Koichi: *See*—
Takahashi, Osamu; Koyama, Koichi; and Koya, Keizo, 4,957,848, Cl. 430-203.000.

Koyo Seiko Co., Ltd.: *See*—
Tnutsui, Takashi, 4,957,328, Cl. 301-105.00R.

Kozuki, Suzumu; Takimoto, Hiroyuki; Kashida, Motokazu; Takahashi, Koji; and Nagasawa, Kenichi, to Canon Kabushiki Kaisha. Device of mulit-channel rotary head type having function to discriminate recorded state. 4,958,246, Cl. 360-77.150.

Kraemer, Karl: *See*—
Bohn, Manfred; Dittmar, Walter; Peil, Heinz G.; Futterer, Eberhard; and Kraemer, Karl, 4,957,730, Cl. 424-61.000.

Kraft General Foods: *See*—
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Kratz, Wilbur C.: *See*—
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Krause, Klaus: *See*—
Wagner, Wolf-Dietrich; Springer, Willi; Meissner, Ludwig; Bonfert, Helmut; Botticher, Michael; Hardt, Thomas; Klumpp, Rolf; Krause, Klaus; Peters, Arndt; Plattner, Ernst; Strobel, Wolfgang; Waller, Wolfgang; and Wiemann, Gunter, 4,957,068, Cl. 123-41.82R.

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Kuhlman, Howard W., to General Motors Corporation. Releasable connector for closure operating mechanism. 4,956,939, Cl. 49-347.000.

Kuijk, Karel E.; and Stroomer, Martinus V. C., to U.S. Philips Corporation. Display device and method of driving such a device. 4,958,152, Cl. 340-784.000.

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Inamori, Masahito; Horii, Tetsuo; Shimazu, Tomonori; and Sugaya, Masaji, 4,957,935, Cl. 514-383.000.

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Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, 4,957,906, Cl. 514-42.000.

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Kusuda, Hidefumi; Konishi, Katsuji; and Kanda, Kazunori, to Nippon Paint Co., Ltd. Photosensitive flexographic resin plate. 4,957,850, Cl. 430-271.000.

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Kusz, Maximillian, to Owens-Illinois Closure Inc. Child resistant closure. 4,957,210, Cl. 215-220.000.

Kuszyk, Jack A.: *See*—
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Kutsuki, Tetsuo, to Matsushita Electric Industrial Co., Ltd. Automatic frequency change device. 4,958,228, Cl. 358-158.000.

Kutz, Giora, to Azimuth Ltd. Device for determining true bearing during daytime. 4,956,920, Cl. 33-268.000.

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Kyburz, Emilio: *See*—
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Kyocera Corporation: *See*—
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LaBarge, Robert L., to Aluminum Company of America. Anchor for plastic cap. 4,957,216, Cl. 220-379.000.
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Labuda, Lawrence L.: *See*—
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Lahille, Michel A.; and Dibie, Alain J., to Biomat, S.A.R.L. Anti-embolic filter. 4,957,501, Cl. 606-200.000.
Lahr, Helfrid; and Pontani, Bernd, to Deutsche Gesellschaft fur Wiederaufarbeitung von Kernbrennstoffen mbH. Apparatus for handling a fuel element skeleton. 4,957,692, Cl. 376-260.000.
Lai, Stefan K. C.: *See*—
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Laird, Walter J.: *See*—
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Lakhani, Kishor M.: *See*—
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Lakso, Matthew L., to Priority Mfg. Corp. Interlock system. 4,957,334, Cl. 312-221.000.
Lalo, Jack: *See*—
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Lam, William Y., to Ethyl Petroleum Additives, Inc. Lubricant compositions. 4,957,643, Cl. 252-47.500.
Lambert, Susan L.: *See*—
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Lammens, Robert F.; Mahler, Hans F.; and Serno, Peter, to Bayer Aktiengesellschaft. Infusion solutions of 1-cyclopropyl-6-fluoro-1,4-di-hydro-4-oxo-7-(1-piperazinyl)-quinoline-3-carboxylic acid. 4,957,922, Cl. 514-253.000.
Lammers, Bryan G.; and Blaha, Kenneth V., to Caterpillar Inc. Guard assembly for a vehicle. 4,957,180, Cl. 180-69.100.
Lamonte, Ronald R., to Hoechst Celanese Corporation. Preparation of polyarylate of improved color with cobalt salt. 4,957,996, Cl. 528-181.000.
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Lane, Dale. Shower fixture. 4,956,883, Cl. 4-605.000.
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Langhammer, Hans-Jurgen: *See*—
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Lau, Hon C.: *See*—
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Lau, Louis K. S., to Westinghouse Electric Corp. Pressurized water nuclear reactor system with hot leg vortex mitigator. 4,957,693, Cl. 376-298.000.
Laurent, Jean: *See*—
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Laval, Francois; and Vignane, Pascal, to Commissariat A L'Energie Atomique. 5-nitro-2-(3,5-diamino-2,4,6-trinitrophenyl)-1,2,4-triazole, its preparation process and explosive material containing it. 4,958,027, Cl. 548-264.800.
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Lawrence, Peter; Nazmy, Mohamed; and Staubli, Markus, to Asea Brown Boveri Ltd. Precipitation-hardenable nickel-base superalloy with improved mechanical properties in the temperature range from 600 to 750 degrees celsius. 4,957,703, Cl. 420-448.000.
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Leber, Rudolph J.: *See*—
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Lee, Chien H. Cleaning apparatus for contact lenses. 4,957,130, Cl. 134-158.000.
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Lee, Gary C. M., to Allergan, Inc. Anti-inflammatory furanones. 4,957,917, Cl. 514-231.500.
Lee, Linda G.; and Chen, Chia-Huei, to Becton, Dickinson and Company. Detection of Reticulocytes, RNA and DNA. 4,957,870, Cl. 436-63.000.
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Lee, Yuan-Ho. Modular concrete form. 4,957,272, Cl. 249-196.000.
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Lehmann, Hanno; Wasen, Ilioi; and Pointurier, Hubert, to Westfalia Separator AG. Method of producing rennet cheese from raw milk. 4,957,751, Cl. 426-36.000.
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Lehmussaari, Antti; and van der Ham, Wim, to Dorr-Oliver Incorporated; and Alko Ltd. Process for producing starch from cereals. 4,957,565, Cl. 127-68.000.
Lehrman, David. Apparatus for securing an iron to an ironing board cover. 4,956,928, Cl. 38-107.000.
Leib, Kenneth G., to Grumman Aerospace Corporation. Robotic vision, optical correlation system. 4,958,376, Cl. 382-31.000.
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Leluan, Sidney J., Jr. Universal cup and saucer display. 4,957,263, Cl. 248-473.000.
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Lenkauskas, Edmundas. Wire spring prosthesis for ossicular reconstruction. 4,957,507, Cl. 623-10.000.
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Lentz, Gregory A.: *See*—
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Leonard, Leonie A.: *See*—
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Lepley, James W., to Flying Dutchman, Inc. Flail chain unloader for particulate material. 4,957,404, Cl. 414-324.000.
Lepore, Robert G.; Hansen, Hannelore G.; and Steinman, Vivien Y., to Hughes Aircraft Company. Forced correlation/mixed mode tracking system. 4,958,224, Cl. 358-126.000.
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Letemps, Bernard; Leclercq, Jacques; and Dereims, Philippe, to Saint-Gobain Vitrage. Method and apparatus for bending and tempering glass plates. 4,957,528, Cl. 65-104.000.
Letsinger, Robert L., to Northwestern University. Cholesteryl modified oligonucleotides. 4,958,013, Cl. 536-27.000.
Levine, Jules D.; and Jensen, Millard J., to Texas Instruments Incorporated. Method of forming an array of apertures in an aluminum foil. 4,957,601, Cl. 156-665.000.
Lewis, John R., Jr., to Shakespeare Company. Low profile, broad band monopole antenna. 4,958,164, Cl. 343-749.000.
Lewis, Roy G.: *See*—
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Liang, Marc D.; Narayanan, Krishna; and Ross, Eugene D., to Montefiore Hospital Association of Western Pennsylvania. Normally closed clamp. 4,957,500, Cl. 606-157.000.
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Lichtenstein, Hans: *See—*
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Lieberum, Karl; Hofmeister, Werner; and Grunewald, Peter, to Wegmann & Co. GmbH, Firma. Rammer for artillery shells. 4,957,028, Cl. 89-47.000.
Liebrecht, Jeffery W.: *See—*
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Life Technologies Inc.: *See—*
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Lin, Jui C. Auxiliary lock with an extensible device. 4,957,315, Cl. 292-337.000.
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Lindley, Stephen M.; and Stein, Brandy L. Head support apparatus. 4,956,881, Cl. 4-517.000.
Linnert, Peter J., to American Standard Inc. Sound attenuating liquid-gas separator. 4,957,517, Cl. 55-184.000.
Linz, Dieter; and Elsner, Peter, to Messer. Griesheim. Flushing unit. 4,957,133, Cl. 137-240.000.
Lipatov, Viktor A.; Guskov, Igor A.; and Kanshin, Nikolaevich N. Surgical suturing instrument. 4,957,499, Cl. 606-153.000.
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Lipsker, Yitshaq; and Prokupetz, Boris. Soil drilling equipment. 4,957,175, Cl. 175-94.000.
Lisak, Stephen P.; and Purdy, Harold L., to Textron Inc. Window adjustment mechanism. 4,956,942, Cl. 49-502.000.
Liu, Chin-Lang. Bicycle frame tube new coupling structure. 4,957,388, Cl. 403-344.000.
Liu, Hsiao C. Linking mechanism for sewing machine. 4,957,053, Cl. 112-237.000.
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Fischer, Francis; Calmes, Jean-Paul; and Cron, Alain, 4,956,988, Cl. 72-208.000.
Mettler, Hans P.; Griffiths, Gareth; Mills, Lester; and Previdoli, Felix, 4,958,044, Cl. 558-431.000.
Lopez-Merono, Jose: *See—*
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Lord Corporation: *See—*
Thorn, Richard P., 4,957,279, Cl. 267-140.500.
L'Oreal: *See—*
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Lorenz, Gisela: *See—*
Schuetz, Franz; Sauter, Hubert; Brand, Siegbert; Wenderoth, Bernd; Baus, Ulf; Reuther, Wolfgang; Lorenz, Gisela; and Ammermann, Eberhard, 4,957,937, Cl. 514-407.000.
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Loutfy, Raouf O.; Weisbrod, Kirk R.; and Withers, James C., to Aluminum Company of America. Production of partially calcined carbonaceous reductant using steam. 4,957,722, Cl. 423-496.000.
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Olson, Rick A.; and Lowe, Perry E., 4,957,412, Cl. 415-189.000.
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Lowrey, Tyler A.; and Chance, Randal W., to Micron Technology, Inc. Reduced mask manufacture of semiconductor memory devices. 4,957,878, Cl. 437-52.000.
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Yodice, Richard; and Lentz, Gregory A., 4,957,648, Cl. 252-8.600.
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Homes, Graham D., 4,957,275, Cl. 251-129.020.
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Lyons, John E.: *See—*
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M. A. Industries, Inc.: *See—*
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MacDermid, Incorporated: *See—*
Cordani, John L., 4,957,653, Cl. 252-142.000.
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Mace, Leslie E.; Knodle, Daniel W.; Labuda, Lawrence L.; and Nuzzo, Philip F., to NTC Technology Inc. Gas analyzer. 4,958,075, Cl. 250-343.000.
MacGregor Golf Company: *See—*
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Macholdt, Hans-Tobias; Sieber, Alexander; Schui, Franz; and Deubel, Reinhold, to Hoechst Aktiengesellschaft. Specifically influencing the triboelectric effect of azo pigments. 4,957,841, Cl. 430-110.000.

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MacIntyre, Gladys L.; and Lok, Roger, to Eastman Kodak Company. Photographic recording material with improved raw stock keeping. 4,957,855, Cl. 430-611.000.

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Harris, Stephen J.; Woods, John G.; Rooney, John M.; MacManus, Maruecn G.; and Guthrie, John, 4,957,960, Cl. 524-243.000.

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Alessi, Paula J.; Faul, William H.; Giorgianni, Edward J.; Koop, Donald A.; and Madden, Thomas E., 4,958,220, Cl. 358-76.000.

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Maeda, Naoki: *See*—
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Yamanaka, Toshihiro; Horie, Nobuyuki; Kobayashi, Shozou; Deguchi, Toshihisa; Yamaguchi, Takeshi; Maeda, Shigemi; Ninhioka, Yoshiki; and Sugiura, Teruki, 4,958,337, Cl. 369-58.000.

Maeda, Takashi; Yamashita, Tsuyoshi; and Nakamura, Mitsuo, to Honda Giken Kogyo Kabushiki Kaisha. Roof lining structure for motor vehicle. 4,957,797, Cl. 428-77.000.

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Maegawa, Hiroji; and Omuta, Tatsuro, to Takatori Corporation. Automatic fitting apparatus for hose part of half made pantyhose. 4,957,051, Cl. 112-121.120.

Maehara, Fuyuki: *See*—
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Maehata, Koukichi: *See*—
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Mahaux, Jean-Marie: *See*—
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Mahieu, William R. ARC severing and displacement method and apparatus for fault current interruption. 4,958,052, Cl. 200-148.00R.

Mahler, Hans F.: *See*—
Lammens, Robert F.; Mahler, Hans F.; and Serno, Peter, 4,957,922, Cl. 514-255.000.

Maier, Alfred E.; Cabral, Antonio W. M.; and Silva, Carlos P. S. E., to Westinghouse Electric Corp. Circuit breaker with individual gap adjustment at high and low settings of magnetic trip. 4,958,136, Cl. 335-42.000.

Maier, Friedrich; Dubach, Fredi; Rock, Erich; and Brustle, Klaus, to Julius Blum Gesellschaft m.b.H. Connector for connecting two elements. 4,956,956, Cl. 52-584.000.

Maier-Laxhuber, Peter; and Kaubek, Fritz. Adsorption apparatus used as an electro-heating storage. 4,956,977, Cl. 62-106.000.

Main, William E., to Motorola, Inc. Current source regulator. 4,958,122, Cl. 323-315.000.

Mair, Bernard. Fastening device. 4,956,900, Cl. 24-606.000.

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Major, John J.; and Spector, George. Croquet game modified. 4,957,290, Cl. 273-56.000.

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Priem, Curtis; Malachowsky, Chris; and Webber, Thomas, 4,958,146, Cl. 340-703.000.

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Marlett, Everett M.; Malcolm, Arcelio J.; and Park, Won S., 4,957,726, Cl. 423-644.000.

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Mallozzi, Joseph D.: *See*—
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Maly, Hans O.: *See*—
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Mammone, Robert J.: *See*—
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Mamone, John R.; Hutcheson, Neale C.; Mallozzi, Joseph D.; Daniels, Edward P.; and Cheng, Chikou. System for accounting for postage expended by a postage meter having security during editing of accounts. 4,958,291, Cl. 364-464.020.

Mango, Joseph R.: *See*—
Beno, Steven J.; and Mango, Joseph R., 4,957,235, Cl. 227-156.000.

Maniglia, Anthony J. Partially implantable hearing aid device. 4,957,478, Cl. 600-25.000.

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Maranci, Artus; Peake, Steven L.; and Kaminski, Stanley S., to American Cyanamid Company. Advance composites with thermoplastic particles at the interface between layers. 4,957,801, Cl. 428-147.000.

Marangone, Nereo: *See*—
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Marathon Oil Company: *See*—
Mehler, Marvin R., 4,956,993, Cl. 73-38.000.

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Marcucci, Albert. Jogger's nightstick. 4,957,057, Cl. 116-22.00A.

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Maria de Kort, Adrianus H.; and van Eerde, Paul, to Heineken Technisch Beheer B.V. Process for making beer containing an unfermented beer product. 4,957,766, Cl. 426-592.000.

Maria de Kort, Andrianus H.; and van Erede, Paul, to Heineken Technisch Beheer B.V. Method of making a non-alcoholic beer containing spray-dried wort. 4,957,767, Cl. 426-590.000.

Marlett, Everett M.; Malcolm, Arcelio J.; and Park, Won S., to Ethyl Corporation. Preparation of amine alanes and lithium aluminum tetrahydride. 4,957,726, Cl. 423-644.000.

Marlowe, Huston; Tao, Michikazu J.; and Pound, Virgil, to Paccar Inc. Aerodynamically configured cab roof assembly for a truck. 4,957,322, Cl. 296-180.200.

Marohn, Heinz. Process to manufacture a reaction resin cement building material mixture. 4,957,951, Cl. 523-401.000.

Marold, Freimut; and Heisel, Michael, to Linde Aktiengesellschaft. Process and reactor for catalytic reaction of H_2S and SO_2 to sulfur. 4,957,724, Cl. 423-574.00R.

Maroldo, Stephen G.; Betz, William R.; and Borenstein, Noah, to Rohm and Haas Company. Carbonaceous adsorbents from pyrolyzed polysulfonated polymers. 4,957,897, Cl. 502-432.000.

Maroney, Patrick: *See*—
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Marowski, Robert E.: *See*—
Castrignano, Frank; Foote, James C., Jr.; Marowski, Robert E.; and Young, Richard D., 4,957,584, Cl. 156-361.000.

Marschall, Richard A. Hydrophone and array thereof. 4,958,329, Cl. 367-20.000.

Marsh, John F.: *See*—
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Martin, Edward S.: *See*—
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Martin, Neil F.; and Robinson, Howard N., to Bloom, Leonard; and Towsend, Marvin S., a part interest. Topical treatment of blepharitis. 4,957,918, Cl. 514-235.800.

Martin, Norman G.; and Eubank, William J., to Ford Motor Company. Stowable vehicle seat with seat back position controller. 4,957,321, Cl. 296-65.100.

Martin, Robert L., to Tracker Marine Corporation. Retractable arrangement for fishing boat console components. 4,957,056, Cl. 114-343.000.

Martinez, Robert G.: *See*—
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Maruyama, Takashi: *See*—
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Masaki, Hiroshi: *See*—
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Masami, Tsujimoto: *See—*
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Maschelein, Charles: *See—*
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Masco Corporation: *See—*
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Mashimo, Akira: *See—*
Yamaguchi, Hirohisa; and Mashimo, Akira, 4,958,234, Cl. 358-327.000.

Massachusetts Institute of Technology: *See—*
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Black, Jerry G.; and Ehrlich, Daniel J., 4,957,775, Cl. 427-53.100.
Crawley, Edward F.; and Hagood, Nesbitt, 4,958,100, Cl. 310-328.000.
Ilderem, Vida; Reif, L. Rafael; and Tedrow, Prabha K., 4,957,777, Cl. 427-55.000.

Masse, Christophe; and Philippe, Michel, to Cebal. Method of preparing pre-distorted images for decorating a shaped blank. 4,956,906, Cl. 413-8.000.

Massiot, Dominique: *See—*
Brevard, Christian; Costures, Jean-Pierre; Massiot, Dominique; Rifflet, Jean-Claude; and Taulelle, Francis, 4,958,126, Cl. 324-318.000.

Massouda, Debora F.: *See—*
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Masuda, Shuji: *See—*
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Masuyama, Fujimitsu; Daikoku, Takashi; Haneda, Hisao; Yoshikama, Kunihiko; Teranishi, Hiroshi; and Iseda, Atsuro, to Sumitomo Metal Industries, Ltd.; and Mitsubishi Jukogyo Kabushiki Kaisha. High-strength high-Cr ferritic heat-resistant steel. 4,957,701, Cl. 420-69.000.

Materials Research Corporation: *See—*
Hurwitt, Steven D.; Wagner, Israel; Hieronymi, Robert; and Van Nutt, Charles, 4,957,605, Cl. 204-192.120.

Mathers, James P.; and Humpal, Kathleen M., to Minnesota Mining and Manufacturing Company. Dimensionally-controlled ceramics. 4,957,554, Cl. 106-35.000.

Mathers, James P.; Wood, William P.; and Forester, Thomas E., to Minnesota Mining and Manufacturing Company. Aluminum oxide/aluminum oxynitride/group IVB metal nitride abrasive particles derived from a sol-gel process. 4,957,886, Cl. 501-96.000.

Mathis, Mac A.: *See—*
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Matoba, Mikio: *See—*
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Matrak, Edgard: *See—*
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Matsubayashi, Kaneo, to Toyo Suisan Kikai Co. Ltd. Apparatus for collecting fish eggs. 4,956,894, Cl. 17-58.000.

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Matsuda, Hiroshi: *See—*
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Matsuda, Shuichi; and Watakabe, Yaichiro, to Mitsubishi Denki Kabushiki Kaisha. Method for manufacturing photomask. 4,957,834, Cl. 430-5.000.

Matsuda, Toshiro, to Nissan Motor Company, Limited. Malfunction preventive anti-skid brake control system for automotive brake system. 4,957,329, Cl. 303-97.000.

Matsuhisa, Hirohide, to Canon Kabushiki Kaisha. Pressure-sensitive transfer member. 4,957,813, Cl. 428-336.000.

Matsui, Masataka: *See—*
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Matsui Shikiso Chemical Co., Ltd.: *See—*
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Matsui, Toru; and Ueda, Hiroshi, to Minolta Camera Kabushiki Kaisha. Focus detecting device and auxiliary illuminating device therefor. 4,958,180, Cl. 354-403.000.

Matsumoto, Motoaki: *See—*
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Matsumoto, Shinichi; Tanaka, Toru; Ishikawa, Yutaka; Matsuura, Shinji; Shinjoh, Hirofumi; and Ozawa, Masakuni, to Toyota Jidosha Kabushiki Kaisha Cataler Industrial Co. Ltd; and Kabushiki Kaisha Toyota Chuo Kenkusho. Catalyst for purification of exhaust gases. 4,957,896, Cl. 502-304.000.

Matsumoto, Shunichiro; Inui, Tsutomu; Ichiyasu, Rokuo; and Chiba, Yoshitaka, to Hitachi Metals, Ltd. Rare earth metal-iron group metal target, alloy powder therefor and method of producing same. 4,957,549, Cl. 75-246.000.

Matsumoto, Yukio; and Kunii, Nobuaki, to Asahi Glass Company, Ltd. Prepolymer composition, process for its production, and its use. 4,957,959, Cl. 524-196.000.

Matsumoto, Yukoh: *See—*
Hashizume, Motomu; and Matsumoto, Yukoh, 4,958,158, Cl. 341-143.000.

Matsumura, Hideo; Nishino, Hirohito; Fukuyama, Hidetoshi; Yamazaki, Kazutoshi; and Suzuki, Hiromitsu, to Sekisui Kagaku Kogyo Kabushiki Kaisha. Electrochemical detection device. 4,957,614, Cl. 204-411.000.

Matsumura, Susumu: *See—*
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Matsunaga, Kenichi: *See—*
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Matsunaga, Satoshi: *See—*
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Matsunaga, Shiro: *See—*
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Matsuo, Isaya; Urabe, Suehiro; and Fujisawa, Eiichi, to Nissan Motor Co., Ltd. Intake system for V-type internal combustion engine. 4,957,071, Cl. 123-52.0MV.

Matsuo, Toru: *See—*
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Matsuoka, Shigeki: *See—*
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Matsushige, Naoki: *See—*
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Matsushita Electric Industrial Co., Ltd.: *See—*
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Saitoh, Susumu; Taniguchi, Syozo; Enomoto, Akio; and Matsuzawa, Teruyoshi, 4,958,296, Cl. 364-509.000.

Mattas, Charles B.; Van Zanten, Egbert; and Szuba, Stefan P., to North America Philips Corporation. Switching arrangement for hid lamps. 4,958,107, Cl. 315-289.000.

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Bonne, Ulrich; and Matthys, Robert J., 4,958,076, Cl. 250-343.000.

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McCauley, John R., to UOP. Stable intercalated clays and preparation method. 4,957,889, Cl. 502-65.000.

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McDonald, Henry H. Cannulated spring forceps for intra-ocular lens implantation method. 4,957,505, Cl. 623-6.000.

McHugh, George J., to AGF Manufacturing, Inc. Device for cleaning a drain. 4,957,123, Cl. 134-167.00C.

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McIntosh, Robert H., Sr.: *See*—
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McMahon, Steven L.: *See*—
Nebesh, Eugene; Plundo, Robert A.; and McMahon, Steven L., 4,957,895, Cl. 502-228.000.

McMaster, Harold A.; and Balestra, Ben M., to Glasstech, Inc. Apparatus for heating bending and quenching glass sheets. 4,957,531, Cl. 65-273.000.

McVay, W. Patrick, to Cabot Medical Corporation. Apparatus for collecting and handling tissue during uterine evacuation procedure. 4,957,492, Cl. 604-319.000.

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Hipps, Jesse, Sr.; and Burkholder, Amy L., 4,957,843, Cl. 430-138.000.

Measurex Corporation: *See*—
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Meeker, John G. Wall shield and chimney support. 4,957,098, Cl. 126-531.000.

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Meltzer Industries Corporation: *See*—
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Sum, Michael J.; Bennett, George W.; Merrell, Steven A.; and Walker, Neil, 4,958,289, Cl. 364-431.010.

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Verclyte, Eddy; Meyns, Ignace; and Glorie, Patrick, 4,957,145, Cl. 139-434.000.

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Cleverley, John A.; Marsh, John F.; Skinner, Philip; and Miasik, Gaynor M., 4,957,642, Cl. 252-42.700.

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Knudsen, Christopher G.; and Michaely, William J., 4,957,540, Cl. 71-123.000.

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Micromanipulator Co., Inc., The: *See*—
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Farah-Bakhsh, Mohammad H.; and Casper, Stephen L., 4,958,088, Cl. 307-443.000.
Lowrey, Tyler A.; and Chance, Randal W., 4,957,878, Cl. 437-52.000.
Roberts, Gregory N., 4,958,091, Cl. 307-451.000.

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Mika, Aram M.: *See*—
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Millar, Huntly D., to Pfizer Hospital Products Group, Inc. Method of using a doppler catheter. 4,957,111, Cl. 128-662.060.

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Miller, David J.; Miller, Allen R.; and Miller, Charles P., 4,957,198, Cl. 198-513.000.

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Miller, William P. Hierarchically multiplexed optical recording system for storage of digital data. 4,958,338, Cl. 369-59.000.

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Schoendorfer, Donald W.; and Miller, William R., 4,957,108, Cl. 128-632.000.

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Mettler, Hans P.; Griffiths, Gareth; Mills, Lester; and Previdoli, Felix, 4,958,044, Cl. 558-431.000.

Mills, Nigel G., to Toledo Scale Corporation. Weigh-in-motion scale. 4,957,178, Cl. 177-134.000.

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Inazawa, Yoshizumi; Milthorp, Brian; and Thompson, Bruce, 4,958,244, Cl. 360-72.100.

Mims, Ken, to Uddo-Mims International, Inc. Apparatus for removing sediment from ponds. 4,957,622, Cl. 210-170.000.

Mimura, Takashi, to Fujitsu Limited. Resonant tunneling minority carrier transistor. 4,958,201, Cl. 357-16.000.

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Min, Suk K.; Park, Seung C.; and Han, Chul W., to Korea Advanced Institute of Science and Technology. Single crystal growing apparatus. 4,957,711, Cl. 422-245.000.

Minai, Masayoshi; Ueda, Yuji; Higashii, Takayuki; Kondo, Michitada;; and Kai, Seiichi, to Sumitomo Chemical Company, Limited. Production of cyclopentenones by enzyme resolution. 4,957,867, Cl. 435-280.000.

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Mink, Bernardus H.: *See*—
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Minnesota Mining and Manufacturing Company: *See*—
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Eleouet, Bernard; Ramage, Michel; and Rongier, Gilles, 4,957,810, Cl. 428-306.600.
Hamer, James D., 4,957,667, Cl. 264-16.000.
Kuney, Clark G., Jr., 4,957,335, Cl. 350-105.000.
Mathers, James P.; and Humpal, Kathleen M., 4,957,554, Cl. 106-35.000.
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Mr. Gasket Co.: *See*—
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Masuyama, Fujimitsu; Daikoku, Takashi; Haneda, Hisao; Yoshikama, Kunihiko; Teranishi, Hiroshi; and Iseda, Atsuro, 4,957,701, Cl. 420-69.000.
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Mitsubishi Kasei Corporation: *See*—
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Mitsubishi Kasei Vinyl Company: *See*—
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Mitsubishi Mining & Cement Co., Ltd.: *See*—
Shimura, Kaizo; Takeuchi, Hiroyasu; Hirano, Masahiro; and Imai, Yohji, 4,957,437, Cl. 433-169.000.

Mitsubishi Petrochemical Company Limited: *See*—
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Mitsubishi Yuka Badische Co., Ltd.: *See*—
Katoh, Naoyuki; Aoki, Masahiro; and Tsukamoto, Takeo, 4,957,677, Cl. 264-135.000.

Mitsuhashi, Masaru: *See*—
Okitsu, Nobuyuki; Mitsuhashi, Masaru; and Iwasa, Yoshio, 4,957,077, Cl. 123-90.310.

Mitsuhashi, Yasuo: *See*—
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Mitsui Petrochemical Industries, Ltd.: *See*—
Agou, Tokinori; Sakashita, Takeshi; Shimoda, Tomoaki; Sudo, Masaru; Kuwabara, Masahiro; and Tanaka, Masahide, 4,957,985, Cl. 526-246.000.
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Mitsui Toatsu Chemicals, Incorporated: *See*—
Takahashi, Seishi, 4,957,864, Cl. 435-226.000.
Urakami, Tatsuhiro; Tanabe, Yoshimitsu; Yamaguchi, Keizaburo; and Yamaguchi, Akihiro, 4,957,994, Cl. 528-90.000.

Mitsuya, Yoshihide: *See*—
Kageyama, Hidehei; Mitsuya, Yoshihide; and Nakazato, Youichi, 4,957,384, Cl. 401-65.000.

Mitter, Gerhard: *See*—
von Bogdandy, Ludwig; Mitter, Gerhard; Koller, Otto; Pochmarski, Luzian; Jaquemar, Christian; and Langhammer, Hans-Jurgen, 4,957,547, Cl. 75-567.000.

Miura, Kosho: *See*—
Goto, Tetsuro; and Miura, Kosho, 4,958,174, Cl. 354-106.000.

Miura, Kyo: *See*—
Oguchi, Yoshihiro; Takasu, Yoshio; and Miura, Kyo, 4,957,854, Cl. 430-495.000.

Miwa, Hiroaki: *See*—
Sudo, Ryoichi; Kobata, Makoto; Miwa, Hiroaki; and Tajima, Tetsuo, 4,957,990, Cl. 526-282.000.

Miyahara, Kazuhiro: *See*—
Yasuda, Keiji; Kamijyo, Tetsuo; and Miyahara, Kazuhiro, 4,957,374, Cl. 374-142.000.

Miyamoto, Hirohisa, to Minolta Camera Kabushiki Kaisha. Image forming apparatus with one reset switch for resetting one type of trouble and a second reset switch for resetting a second type of trouble. 4,958,188, Cl. 355-206.000.

Miyamoto, Jiro; Nakasai, Takashi; and Komai, Yukio, to Toyo Tire & Rubber Co., Ltd. Reinforcing layers for bias tires. 4,957,799, Cl. 428-114.000.

Miyamoto, Kanji: *See*—
Tomoyasu, Takaharu; and Miyamoto, Kanji, 4,958,128, Cl. 324-559.000.

Miyamoto, Masatoshi: *See*—
Saegusa, takeo; Miyamoto, Masatoshi; and Sano, Yoshiyuki, 4,958,005, Cl. 528-408.000.

Miyamura, Masashi; and Kawano, Nobuyuki, to Toyox Co., Ltd. Hose clamping device. 4,956,898, Cl. 24-274.00R.

Miyano, Tetsuji; Suzuki, Kunio; Ushijima, Ryosuke; and Nakagawa, Susumu, to Banyu Pharmaceutical Company, Ltd. Process for preparing 2-carbamoyloxyalkyl-1,4-dihydropyridine derivatives. 4,958,024, Cl. 546-249.000.

Miyauchi, Teruhiko: *See*—
Tokuhiro, Tomoya; Miyauchi, Teruhiko; Kikuchi, Koshin; and Momoi, Teruhiko, 4,957,190, Cl. 187-32.000.

Miyazaki, Toshihiko: *See*—
Tomida, Yoshinori; Matsuda, Hiroshi; Sakai, Kunihiro; Nishimura, Yukuo; Nakagiri, Takashi; and Miyazaki, Toshihiko, 4,957,851, Cl. 430-272.000.

Mizoguchi, Masaaki; Inoue, Susumu; Otsuka, Tatsuo; and Isoyama, Eizo, to Showa Aluminum Corporation. Aluminum heat exchanger provided with fins having hydrophilic coating. 4,957,159, Cl. 165-133.000.

Mizuhara, Howard, to GTE Products Corporation. Method of brazing parts of Ti-Al-Nb alloy. 4,957,236, Cl. 228-263.210.

Mizuma, Takashi: *See*—
Yamada, Kiyoshige; Mizuma, Takashi; and Kishino, Kohji, 4,956,943, Cl. 49-503.000.

Mizuno, Shoji: *See*—
Tan, Kenichi; and Mizuno, Shoji, 4,957,102, Cl. 128-68.000.

Mizuno, Yukio; and Maruyama, Takashi, to Sumitomo Chemical Company, Limited. Thermoplastic resin composition. 4,957,967, Cl. 525-68.000.

Mizuyama, Yaichiro: *See*—
Yamazaki, Kazumasa; Mizuyama, Yaichiro; Horita, Takashi; and Suzuki, Shinichi, 4,957,594, Cl. 204-27.000.

Mobacc B.V.: *See*—
Tempelman, Antonie P., 4,957,239, Cl. 239-117.000.

Mobil Oil Corporation: *See*—
Harandi, Mohsen N., 4,957,709, Cl. 422-134.000.
Owen, Hartley; and Schipper, Paul H., 4,957,617, Cl. 208-113.000.
Shirodkar, Pradeep P., 4,957,969, Cl. 525-86.000.
Shirodkar, Pradeep P., 4,957,972, Cl. 525-240.000.

Mochizuki, Noriya: *See*—
Komatsuzaki, Hiroshi; Kamata, Kazuo; Ohmiya, Akio; Nishimura, Syunji; Umeda, Yoshihito; Mochizuki, Noriya; and Furuya, Eiji, 4,958,179, Cl. 354-195.120.

Mochizuki, Noriyasu; and Nakauchi, Hiroji, to Nakagawa Corrosion Protecting Co., Ltd. Evaluation method of corrosion of steel material embedded in concrete. 4,958,130, Cl. 324-700.000.

Mochizuki, Shuji; Mino, Masayuki; Tanaka, Yutaka; and Tachikawa, Kyoji, to Minolta Camera Kabushiki Kaisha; and Nisca Corporation. Film handling for a laser recorder. 4,958,169, Cl. 346-108.000.

Mody, Pankaj H.: *See*—
McLaughlin, Paul F.; and Mody, Pankaj H., 4,958,270, Cl. 364-187.000.

Mohacsi, Tivadar G.: *See*—
Anderson, Pamela A.; Cipollo, Kent L.; and Mohacsi, Tivadar G., 4,957,938, Cl. 514-412.000.

Molecular Biosystems, Inc.: *See*—
Cerny, David; Mills, Gary J.; and Westkaemper, Peter J., 4,957,656, Cl. 252-311.000.

Molex Incorporated: *See*—
Stanevich, Kenneth W.; and Regnier, Kent E., 4,957,448, Cl. 439-326.000.

Momoi, Teruhiko: *See*—
Tokuhiro, Tomoya; Miyauchi, Teruhiko; Kikuchi, Koshin; and Momoi, Teruhiko, 4,957,190, Cl. 187-32.000.

Monarch Marking Systems, Inc.: *See*—
Hamisch, Paul H., Jr.; and Wisecup, David R., 4,957,379, Cl. 400-120.000.

Monceret, Arthur. Adjustable plier. 4,957,020, Cl. 81-414.000.

Monsanto Company: *See*—
Adur, Ashok M.; and Constable, Robert C., 4,957,968, Cl. 525-74.000.
Jacob, Gary S.; Tyms, A. Stanley; Rademacher, Thomas W.; and Dwek, Raymond A., 4,957,926, Cl. 514-315.000.
Sanzo, Michael A.; Hardy, Medora M.; and Feder, Joseph, 4,957,863, Cl. 435-228.000.

Montefiore Hospital Association of Western Pennsylvania: *See*—
Liang, Marc D.; Narayanan, Krishna; and Ross, Eugene D., 4,957,500, Cl. 606-157.000.

Mooney, Lillian A. Template. 4,957,124, Cl. 132-200.000.

Moore, Neal E., to James River II, Inc. Method of making interfolded sheets of plastic film. 4,957,679, Cl. 264-152.000.

Moore, Robin B., to Apple Computer, Inc. Computer with interface for fast and slow memory circuits. 4,958,304, Cl. 364-521.000.

Morello, Peter S., to Morello, Peter S. Sales records. 4,957,312, Cl. 283-89.000.

Morenings, Gerhard H., to Universal Health Products, Inc. Method of facial toning. 4,957,480, Cl. 604-20.000.

Mori, Leo: *See*—
Tominaga, Mamoru; Mori, Leo; and Akiyama, Junetsu, 4,957,370, Cl. 356-381.000.

Morii, Akira: *See*—
Saito, Yasuhisa; Watanabe, Katsuya; Okuno, Kohichi; Kamio, Kunimasa; and Morii, Akira, 4,957,995, Cl. 528-99.000.

Morikawa, Hirohiko; Kako, Hiroyoshi; Noguchi, Noboru; and Nakanishi, Nobuyasu, to Toyota Jidosha Kabushiki Kaisha. Braking device having an automatic fluid pressure regulating function. 4,957,330, Cl. 303-115.000.

Morikawa, Koji, to Fuji Jukogyo Kabushiki Kaisha. Fuel injection control system for a two-cycle engine. 4,957,089, Cl. 123-486.000.

Morimoto, Keiji: *See*—
Okonogi, Shigeo; Yuguchi, Hiroya; Tanai, Sumio; and Morimoto, Keiji, 4,957,764, Cl. 426-573.000.

Morinaga Milk Industry Co., Ltd.: *See*—
Okonogi, Shigeo; Yuguchi, Hiroya; Tanai, Sumio; and Morimoto, Keiji, 4,957,764, Cl. 426-573.000.

Morinaga, Motoyasu: *See*—
Kinoshita, Jun'ichi; Morinaga, Motoyasu; Furuyama, Hideto; and Hirayama, Yuzo, 4,958,202, Cl. 357-17.000.

Morishita, Mitsuharu; Uota, Kosaku; and Yasukawa, Takeshi, to Mitsubishi Denki Kabushiki Kaisha. Electric power steering apparatus. 4,957,182, Cl. 180-79.100.

Moriwaki, Masahiro: *See*—
Kaneko, Noriaki; Hirata, Yoshimi; and Moriwaki, Masahiro, 4,957,508, Cl. 623-12.000.

Moriya, Shigeru: *See*—
Tsuboi, Toshio; Moriya, Shigeru; and Nakatani, Keiji, 4,958,221, Cl. 358-80.000.

Moriya, Takahiko: *See*—
Itoh, Hitoshi; and Moriya, Takahiko, 4,957,880, Cl. 437-192.000.

Morris, Brian G., to United States of America, National Aeronautics and Space Administration. Tank gauging apparatus and method. 4,956,996, Cl. 73-149.000.

Morris, Harold B., to M. A. Industries, Inc. Manufacture of plastic products. 4,957,671, Cl. 264-40.600.

Morris, James A., to Safety Operating Systems, Inc. Back incline indicator. 4,958,145, Cl. 340-689.000.

Morrison, Ward D.; and Michaud, Arthur A., to Cannon Industries, Inc. Pneumatic drill. 4,957,171, Cl. 173-104.000.

Morrow, Ray E.: *See*—
Jinoian, Vanik N.; Morrow, Ray E.; and Whitehill, Wayne W., 4,957,435, Cl. 433-34.000.

Morsdorf, Peter; Schickaneder, Helmut; Herter, Rolf; Pfahlert, Volker; Engler, Heidrun; and Ahrens, Kurt H., to Heumann Pharma GmbH & Co. Benzimidazoles, and pharmaceutical preparations containing these compounds. 4,957,920, Cl. 514-252.000.

Morse, Mark J.; and Dominesey, Andrew E., to Eastman Kodak Company. Method for making a light-tight cassette. 4,956,908, Cl. 29-438.000.

Morton, Edward W.: *See*—
Wilson, William E.; Morton, Edward W.; and O'Mullan, Daniel W., 4,958,102, Cl. 313-1.000.

Morton Thiokol, Inc.: *See*—
Smith, Bradley W., 4,956,971, Cl. 60-245.000.

Moser, Hans: *See*—
Bohner, Beat; Pissiotasa, Georg; and Moser, Hans, 4,957,535, Cl. 71-76.000.

Moskalev, Eduard P.: *See*—
Parkhomenko, Alexandr I.; Dzjuban, Vitaly S.; and Moskalev, Eduard P., 4,958,256, Cl. 361-331.000.

Motooka, Mikio, to Mitsubishi Jukogyo Kabushiki Kaisha. Uniform speed pinless folding machine. 4,957,280, Cl. 270-47.000.

Motorola, Inc.: *See*—
Hill, Susan C.; Jelemensky, Joseph; Heene, Mark R.; Groves, Stanley E.; and DeBrito, Daniel N., 4,958,277, Cl. 364-200.000.
Main, William E., 4,958,122, Cl. 323-315.000.
Wang, Karl L.; and Feng, Taisheng, 4,958,086, Cl. 307-296.800.

Mouri, Toyohiko: *See*—
Oshita, Saiichiro; and Mouri, Toyohiko, 4,957,181, Cl. 180-79.100.

Moynagh, Philip B.: *See*—
Ojha, Sureshchandra M.; Rosser, Paul J.; and Moynagh, Philip B., 4,957,873, Cl. 437-20.000.

Mrozinski, James S.: *See*—
McAllister, Jerome W.; Kinzer, Kevin E.; Mrozinski, James S.; Johnson, Eric J.; and Dyrud, James F., 4,957,943, Cl. 521-64.000.

MTS Systems Corporation: *See*—
Tellerman, Jacob, 4,958,332, Cl. 367-140.000.

Mudge, Paul R.: *See*—
Pangrazi, Ronald; Walker, James L.; and Mudge, Paul R., 4,957,806, Cl. 428-224.000.

Muehlbach, Klaus: *See*—
Taubitz, Christof; Muehlbach, Klaus; Brandt, Hermann; and Bochlke, Klaus, 4,957,965, Cl. 525-66.000.

Muijs, Cornelis G. M.: *See*—
De Busscher, Cyriel R. J.; Muijs, Cornelis G. M.; and Verweirder, Gery G. R., 4,956,967, Cl. 56-341.000.

Muller, Beat: *See*—
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Muller, Kurt: *See*—
Dreyfuss, Wilfried; Remp, Thomas E.; and Muller, Kurt, 4,957,141, Cl. 138-89.000.

Mullett, Paul W.; and Voth, Elmer D., to Excel Industries, Inc. 4-wheel coordinated steering multi-purpose tractor. 4,957,183, Cl. 180-234.000.

Multiform Desiccants, Inc.: *See*—
Cullen, John S.; and Matrak, Edgard, 4,957,521, Cl. 55-387.000.

Multivac: *See*—
Cipolla, Peter C., 4,957,571, Cl. 156-66.000.

Munk, Werner G.; Klecker, Manfred; and Haas, Franz, to Suedmilch Aktiengesellschaft. Container for foods. 4,957,754, Cl. 426-138.000.

Munro, Paul R.: *See*—
Herscher, Bret A.; and Munro, Paul R., 4,958,294, Cl. 364-483.000.

Muraki, Hideaki: *See*—
Nagai, Teizi; Tokushima, Yasuo; Kubota, Sadao; Suzuki, Kenichirou; Fujitani, Yoshiyasu; Yoshimoto, Taisuke; Muraki, Hideaki; and Tachi, Hideo, 4,957,710, Cl. 422-171.000.

Murari, Bruno: *See*—
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Murase, Satoshi: *See*—
Nakagawa, Susumu; Murase, Satoshi; Ushijima, Ryosuke; and Kato, Yoshiaki, 4,958,029, Cl. 548-430.000.

Murata, Hatsuho; and Ikeda, Hiroshi, to NEC Corporation. Method and apparatus for priority control of incoming calls at ISDN terminals. 4,958,153, Cl. 340-825.500.

Murata, Koji: *See*—
Honkura, Yoshinobu; Fujii, Hideki; and Murata, Koji, 4,957,699, Cl. 420-41.000.

Murata, Kouji: *See*—
Honkura, Yoshinobu; Matsuo, Toru; and Murata, Kouji, 4,957,700, Cl. 420-59.000.

Murohashi, Kozo: *See*—
Fukao, Masuzo; Sakai, Tadashi; and Murohashi, Kozo, 4,957,409, Cl. 414-788.400.

Murphy, William J., to Westinghouse Electric Corp. Circuit breaker with rating plug having memory. 4,958,252, Cl. 361-93.000.

Murray, Stuart W., to CMI Corporation. Air tight storage silo. 4,957,221, Cl. 222-129.000.

Murtfeldt, Robert, to Autonedix Sciences, Inc. Lymph access catheters and methods of administration. 4,957,484, Cl. 604-53.000.

Mutschler, Martha A.: *See*—
Law, David M.; Davies, Peter J.; and Mutschler, Martha A., 4,957,757, Cl. 426-281.000.

Myers, Christopher S.; and Wozniak, Thomas H., to General Motors Corporation; and Hughes Aircraft Company. Method and apparatus for plastic injection molding/encapsulation. 4,957,670, Cl. 264-40.100.

Myers, Michael E.: *See*—
Jones, Wickliffe, deceased; Scarpa, Eric W.; Greenwell, Joseph D.; Nease, Mark R.; Kalany, Robert M.; and Myers, Michael E., 4,956,964, Cl. 53-570.000.

Nabisco Brands, Inc.: *See*—
van Lengerich, Bernhard H., 4,957,041, Cl. 99-353.000.
van Lengerich, Bernhard H., 4,957,042, Cl. 99-353.000.

Nadin, Leonard, to Labinal S.A. Male electrical contact. 4,957,451, Cl. 439-395.000.

Nagagata, Nobuyoshi; and Hiromura, Osamu, to Matsushita Electric Industrial Co., Ltd. Switching power supply. 4,958,268, Cl. 363-16.000.

Nagai, Teizi; Tokushima, Yasuo; Kubota, Sadao; Suzuki, Kenichirou; Fujitani, Yoshiyasu; Yoshimoto, Taisuke; Muraki, Hideaki; and Tachi, Hideo, to Toyota Motor Corporation; Kabushiki Kaisha Toyota Chou Kenkyusho; and Trinity Industrial Corp. Catalytic combustion type exhaust gas processing device and drying furnace for use in coating utilizing the same. 4,957,710, Cl. 422-171.000.

Nagamatsu, Hatsuo: *See*—
Kobayashi, Hidenori; Suwabe, Moriaki; Inakazu, Nobuhiro; and Nagamatsu, Hatsuo, 4,957,682, Cl. 264-255.000.

Nagame, Hiroshi: *See*—
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Nagao, Shigemitsu: *See*—
Torii, Sigeru; Tanaka, Hideo; Taniguchi, Masatoshi; Sasaoka, Michio; Saito, Norio; Shiroi, Takashi; Nagao, Shigemitsu; Kikuchi, Ryo; and Kameyama, Yutaka, 4,958,018, Cl. 540-215.000.

Nagasaki, Munetaka: *See*—
Sotome, Kenichi; and Nagasaki, Munetaka, 4,957,052, Cl. 112-147.000.

Nagasawa, Kenichi: *See*—
Kozuki, Suzumu; Takimoto, Hiroyuki; Kashida, Motokazu; Takahashi, Koji; and Nagasawa, Kenichi, 4,958,246, Cl. 360-77.150.

Nagashima, Nao; Ichikawa, Hiroyuki; and Katayama, Akihiro, to Canon Kabushiki Kaisha. Image processing method and apparatus therefor. 4,958,236, Cl. 358-445.000.

Nagji, Moez M.: *See*—
Grover, Bhadra S.; and Nagji, Moez M., 4,957,715, Cl. 423-228.000.

Nagle, Richard C.: *See*—
Davenport, John M.; Finch, William W.; Hansler, Richard L.; Nagle, Richard C.; and White, Ronald S., 4,958,263, Cl. 362-32.000.

Naito, Tadashi: *See*—
Kaneko, Kuniya; Wakiyama, Harumichi; Naito, Tadashi; and Ando, Toshihiro, 4,958,292, Cl. 364-468.000.

Najjar, Mitri S., to Texaco, Inc. Partial oxidation process including the concentration of vanadium and nickel in separate slag phases. 4,957,544, Cl. 75-500.000.

Nakagawa Corrosion Protecting Co., Ltd.: *See*—
Mochizuki, Noriyasu; and Nakauchi, Hiroji, 4,958,130, Cl. 324-700.000.

Nakagawa, Susumu; Murase, Satoshi; Ushijima, Ryosuke; and Kato, Yoshiaki, to Banyu Pharmaceutical Co., Ltd. Process for the production of isoindoline derivatives, novel intermediates and process for their production. 4,958,029, Cl. 548-430.000.

Nakagawa, Susumu: *See*—
Miyano, Tetsuji; Suzuki, Kunio; Ushijima, Ryosuke; and Nakagawa, Susumu, 4,958,024, Cl. 546-249.000.

Nakagawa, Tetsuya: *See*—
Kiuchi, Atsushi; Kaneko, Kenji; Ishida, Jun; Nakagawa, Tetsuya; Hagiwara, Yoshimune; Akazawa, Takashi; and Sato, Tomoru, 4,958,276, Cl. 364-200.000.

Nakagiri, Takashi: *See*—
Tomida, Yoshinori; Matsuda, Hiroshi; Sakai, Kunihiro; Nishimura, Yukuo; Nakagiri, Takashi; and Miyazaki, Toshihiko, 4,957,851, Cl. 430-272.000.

Nakagome, Yoshinobu; Itoh, Kiyoo; Aoki, Masakazu; Ikenaga, Shin'ichi; Horiguchi, Masashi; and Tanaka, Hitoshi, to Hitachi, Ltd. Low noise semiconductor memory. 4,958,325, Cl. 365-206.000.

Nakahara, Toshiaki: *See*—
Sakashita, Kiichiro; Nakahara, Toshiaki; Tanikawa, Hirohide; Matsushige, Naoki; Yoshida, Satoshi; Fujiwara, Masatsugu; and Mitsuhashi, Yasuo, 4,957,840, Cl. 430-106.600.

Nakahata, Kimio: *See*—
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Nakai, Masaaki: *See*—
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Izumi, Shuji; Nakai, Masaaki; Inoue, Manabu; Fujino, Akihiko; Kawamura, Kunio; Takarabe, Yuji; and Niwa, Masatake, 4,958,184, Cl. 354-474.000.

Nakajima, Kazuto, to Matsushita Electric Industrial Co., Ltd. Method of forming a collar for heating exchanger fin and die for use therein. 4,956,989, Cl. 72-327.000.

Nakajima, Norio: *See*—
Sugiura, Susumu; Sato, Tadashi; and Nakajima, Norio, 4,958,232, Cl. 358-300.000.

Nakakura, Hirofumi; Shibata, Morio; Ishikawa, Haruo; Nakano, Akihisa; Hirota, Hiromi; and Oyabu, Hajime, to Matsushita Electric Industrial Co., Ltd. Apparatus for making bread. 4,957,040, Cl. 99-348.000.

Nakamura, Katsujiro: *See*—
Sugawara, Ken; Nakamura, Katsujiro; Matoba, Mikio; and Sakairi, Shigeru, 4,958,323, Cl. 365-189.010.

Nakamura, Kazuhiro; Yoshioka, Tatsuya; Sawada, Ryoji; and Nakamura, Tomoji, to Sanshin Kogyo Kabushiki Kaisha. Vessel speed detecting device. 4,956,997, Cl. 73-182.000.

Nakamura, Ko; and Ienaga, Kazuharu, to Nippon Zoki Pharmaceutical Co., Ltd. Glycocyamidine derivatives. 4,957,936, Cl. 514-389.000.

Nakamura, Masao; Sakamoto, Norio; and Ito, Takashi, to Konica Corporation. Film winding apparatus. 4,957,247, Cl. 242-67.10R.

Nakamura, Mitsuo: *See*—
Maeda, Takashi; Yamashita, Tsuyoshi; and Nakamura, Mitsuo, 4,957,797, Cl. 428-77.000.

Nakamura, Nobuo: *See*—
Ando, Manabu; Nakamura, Nobuo; Tsuchiya, Yoshitane; Fuse, Hirotaka; Watanabe, Kazuo; and Shinoda, Koushi, 4,956,944, Cl. 51-165.710.

Nakamura, Shinichi: *See*—
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Nakamura, Shogo: *See*—
Kadowaki, Yukio; Matsuoka, Shigeki; and Nakamura, Shogo, 4,958,311, Cl. 364-724.010.
Nakamura, Tohru: *See*—
Homma, Noriyuki; Nakamura, Tohru; Nakazato, Kazuo; Matsumoto, Motoaki; Hayashida, Tetsuya; Kubo, Masaharu; and Sagara, Kazuhiko, 4,958,320, Cl. 365-174.000.
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Nakamura, Youichi: *See*—
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Nakanishi, Nobuyasu: *See*—
Morikawa, Hirohiko; Kako, Hiroyoshi; Noguchi, Noboru; and Nakanishi, Nobuyasu, 4,957,330, Cl. 303-115.000.
Nakanishi, Yoshinori, to Otis Elevator Company. Guide device for hydraulic elevator. 4,957,191, Cl. 187-95.000.
Nakaniwa, Shinpei; and Tomisawa, Naoki, to Japan Electronic Control Systems Company, Limited. Fuel supply control system for internal combustion engine with feature providing engine stability in low engine load condition. 4,957,083, Cl. 123-436.000.
Nakano, Akihisa: *See*—
Nakakura, Hirofumi; Shibata, Morio; Ishikawa, Haruo; Nakano, Akihisa; Hirota, Hiromi; and Oyabu, Hajime, 4,957,040, Cl. 99-348.000.
Nakano, Tomio, to Yamaha Hatsudoki Kabushiki Kaisha. Track for snow vehicle. 4,957,472, Cl. 474-203.000.
Nakano, Yoshio: *See*—
Imai, Yoshihiko; Nakano, Yoshio; Ando, Makoto; Iwamura, Yoshiyuki; and Ishida, Takashi, 4,958,314, Cl. 364-900.000.
Nakasai, Takashi: *See*—
Miyamoto, Jiro; Nakasai, Takashi; and Komai, Yukio, 4,957,799, Cl. 428-114.000.
Nakashima, Mitsuyoshi; Kanamaru, Mitsutaka; Sugiyama, Akira; Terakawa, Masato; Ono, Takaharu; and Horiai, Haruo, to Fujisawa Pharmaceutical Co., Ltd. Diuretic or antihypertensive composition. 4,957,923, Cl. 514-259.000.
Nakata, Mitsuyuki: *See*—
Hirashima, Nobuhiro; Matsunaga, Shiro; and Nakata, Mitsuyuki, 4,957,991, Cl. 526-295.000.
Nakatani, Keiji: *See*—
Tsuboi, Toshio; Moriya, Shigeru; and Nakatani, Keiji, 4,958,221, Cl. 358-80.000.
Nakatani, Shigeki; Koshimoto, Naohide; and Sugimoto, Hiroyuki, to Mazda Motor Corporation. Camshaft structure for double overhead camshaft engine. 4,957,079, Cl. 123-90.340.
Nakatomi, Yoshiyuki; Iwasa, Toshirou; and Kobayashi, Hitoshi, to Alpine Electronics Inc. Method and apparatus for optically detecting the location of a control object in a control panel recess. 4,958,067, Cl. 250-221.000.
Nakauchi, Hiroji: *See*—
Mochizuki, Noriyasu; and Nakauchi, Hiroji, 4,958,130, Cl. 324-700.000.
Nakayama, Manabu, to Sanshin Kogyo Kabushiki Kaisha. Idling noise silencer for marine propulsion unit. 4,957,461, Cl. 440-89.000.
Nakayama, Takeshi: *See*—
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Liang, Marc D.; Narayanan, Krishna; and Ross, Eugene D., 4,957,500, Cl. 606-157.000.
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Ryder, Francis E., 4,957,436, Cl. 433-88.000.
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National Semiconductor Corporation: *See*—
Jansson, Lars G., 4,958,090, Cl. 307-456.000.
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Pangrazi, Ronald; Walker, James L.; and Mudge, Paul R., 4,957,806, Cl. 428-224.000.
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Barthelemy, Philippe; and Naturel, Christian, 4,957,542, Cl. 75-10.390.
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Boguslavsky, Alexandr M.; Semenikhin, Viktor F.; Chergikalo, Vladimir I.; Rozenman, Lev I.; Tregub, Yakov K.; Risman, Arkady I.; Topopolsky, Yankel M.; Khatanzeisky, Egor V.; and Rubin, Eduard A., 4,957,058, Cl. 118-323.000.
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Harrold, David O.; and Powell, Charles F., 4,956,995, Cl. 73-146.000.
Kruse, James W.; and Riley, Donald E., 4,957,359, Cl. 350-637.000.
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Nazmy, Mohamed: *See*—
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NCR Corporation: *See*—
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Hsu, Sawyer C-Y.; Daleo, Carlo V.; Valentine, Sidney L.; Fratis, James; and Fischer, Robert W., Jr., 4,957,333, Cl. 312-108.000.
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Hayasaka, Sigeki, 4,956,895, Cl. 24-3.00J.
Murata, Hatsuho; and Ikeda, Hiroshi, 4,958,153, Cl. 340-825.500.
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Tanaka, Shin-Ichi, 4,958,208, Cl. 357-34.000.
Yasuda, Sadahiro; and Nishiguchi, Yukihiro, 4,958,140, Cl. 340-146.200.
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Neff, Clayton; and Chowdhury, Mofazzal H., to Alfa-Laval Agri Inc. Pulsation selector. 4,957,065, Cl. 119-14.370.
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Nelson, John D., to Olin Corporation. Chitosan pyrithione as antimicrobial agent useful in personal care products. 4,957,908, Cl. 514-55.000.
Nelson, Ned. Pre-cast, reinforced concrete retaining wall system. 4,957,395, Cl. 405-287.000.
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Nelson, Thomas E., to Soltech, Inc. Method of making spaced-wall appliance with a sealing and insulating device between said walls. 4,956,909, Cl. 29-451.000.
Nencioni, Luciano; Pileri, Piero; Peppoloni, Samuele; and Silvestri, Sergio, to Sclavo S.p.A. Composition for vaccines. 4,957,736, Cl. 424-88.000.
Neri, Carlo; Nodari, Nereo; Bernanetti, Erik; and Sandre, Giovanni, to Enichem Synthesis S.p.A. Solid stabilizer composition for organic polymers, and process for preparing it. 4,957,956, Cl. 524-120.000.
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Neuhaus, Peter: *See*—
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Ng, Steve Y. W.: *See*—
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Yasuda, Keiji; Kamijyo, Tetsuo; and Miyahara, Kazuhiro, 4,957,374, Cl. 374-142.000.

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Niebauer, Kenneth L., to Kennametal Inc. Cutting insert with chip control. 4,957,396, Cl. 407-114.000.

Nigon, Victor: *See*—
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Nikon Corporation: *See*—
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Nio, Misato: *See*—
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Nippon Air Brake Company: *See*—
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Nippon Air Brake Co., Ltd.: *See*—
Ishiwata, Ichiro, 4,957,140, Cl. 137-505.250.

Nippon Electric Glass Co., Ltd.: *See*—
Fujii, Sigezo; Uesugi, Tsuneya; and Sakamoto, Kiyoshi, 4,957,530, Cl. 65-172.000.

Nippon Hybrid Technologies Co., Ltd.: *See*—
Esashi, Kiyoyuki, 4,957,561, Cl. 106-286.300.

Nippon Kokan Kabushiki Kaisha: *See*—
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Nippon Paint Co., Ltd.: *See*—
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Nippon Pharmaceutical Development Institute Company, Ltd.: *See*—
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Nippon Piston Ring Co., Ltd.: *See*—
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Nippon Shokubai Kagaku Kogyo Co., Ltd.: *See*—
Imamura, Seiichiro; Terui, Sadao; Sano, Kunio; Nishikawa, Kazuyoshi; and Inoue, Akira, 4,957,717, Cl. 423-240.000.

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Yamazaki, Kazumasa; Mizuyama, Yaichiro; Horita, Takashi; and Suzuki, Shinichi, 4,957,594, Cl. 204-27.000.

Nippon Suisan Kaisha, Ltd.: *See*—
Tokura, Seiichi; Koriyama, Tsuyoshi; Chiba, Yoshiyuki; and Satake, Mikio, 4,958,012, Cl. 536-20.000.

Nippon Zeon Co., Ltd.: *See*—
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Nippon Zoki Pharmaceutical Co., Ltd.: *See*—
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Nippondenso Co., Ltd.: *See*—
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Shibata, Hiroshi; Maehara, Fuyuki; Shintai, Akira; and Kato, Hidetoshi, 4,957,876, Cl. 437-209.000.

Nisato, Dino: *See*—
Gubin, Jean; Chatelain, Pierre; Descamps, Marcel; Nisato, Dino; Inion, Henri; Lucchetti, Jean; Mahaux, Jean-Marie; and Vallat, Jean-Noel, 4,957,925, Cl. 514-299.000.

Nisca Corporation: *See*—
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Nishibe, Takashi; and Yokoyama, Shotaro, to Fuji Electric Co., Ltd. Clock signal generating circuit. 4,958,362, Cl. 377-20.000.

Nishida, Takehiko: *See*—
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Nishikawa, Kazuyoshi: *See*—
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Komatsuzaki, Hiroshi; Kamata, Kazuo; Ohmiya, Akio; Nishimura, Syunji; Umeda, Yoshihito; Mochizuki, Noriya; and Furuya, Eiji, 4,958,179, Cl. 354-195.120.

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Nishino, Hiroshi, to Yamasaki, Arata; and SK Kohki Co., Ltd. Conductive coating composition comprising graphite intercalation compound and process for preparing the intercalation compound. 4,957,723, Cl. 423-449.000.

Nishio, Taichi; Abe, Hiroomi; Suzuki, Yasurou; Sanada, Takashi; Hosoda, Satoru; and Okada, Takayuki, to Sumitomo Chemical Company, Ltd. Thermoplastic resin composition. 4,957,966, Cl. 525-66.000.

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Teraji, Tsutomu; Yamamura, Atsushi; Kamuro, Yasuo; Hirai, Koichi; and Fujii, Seiichi, 4,957,537, Cl. 71-95.000.

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Nobuyasu, Ando, to Sanden Corporation. Heat exchanger. 4,957,158, Cl. 165-110.000.

Nodari, Nereo: *See*—
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Noguchi, Kenji; Toyama, Tsuyoshi; Kobayashi, Shinichi; Andoh, Nobuaki; and Kohda, Kenji, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor memory device with error check and correcting function. 4,958,352, Cl. 371-40.100.

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Noonan, Denis E., to Grumman Aerospace Corporation. Variable depth cold working tool. 4,956,991, Cl. 72-370.000.
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Gabryszewski, Gregory J., 4,957,783, Cl. 427-424.000.
Johnson, Stephen N., 4,956,963, Cl. 53-442.000.
Norris, Alan H. Use of bacteriophages to inhibit dental caries. 4,957,686, Cl. 424-50.000.
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Ochii, Kiyofumi; Matsui, Masataka; and Ozawa, Osamu, to Kabushiki Kaisha Toshiba. Static random access memory. 4,958,316, Cl. 365-63.000.
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Ofria, Lawrence E.; and Lyndhurst, Francis R., to Thunder Power, Inc. Engine air-fuel intake triple manifold. 4,957,070, Cl. 123-52.0MB.
Ogawa, Kensuke; Katsuyama, Toshio; and Fukuzawa, Tadashi, to Hitachi, Ltd. Optical quantum interference device and method of modulating light using same. 4,957,337, Cl. 350-96.130.
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Tomagou, Satoshi; Kato, Toshikazu; Inoue, Hiroshi; and Ogawara, Kensuke, 4,958,003, Cl. 528-364.000.
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Hashimoto, Seiji; and Ohzu, Hayao, 4,958,085, Cl. 307-262.000.
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Nishio, Taichi; Abe, Hiroomi; Suzuki, Yasurou; Sanada, Takashi; Hosoda, Satoru; and Okada, Takayuki, 4,957,966, Cl. 525-66.000.

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Sawa, Takao; Okamura, Masami; Yamada, Taiju; Kusaka, Takao; and Sasaki, Hiroshi, 4,958,134, Cl. 333-12.000.

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Takeda, Takayuki; Masaki, Hiroshi; and Nose, Isamu, 4,958,335, Cl. 369-44.140.
Yokouchi, Hiroshi, 4,958,275, Cl. 364-200.000.

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O'Lenick, Anthony J., Jr. N-alkoxylated ether 2-pyrrolidones. 4,958,032, Cl. 548-543.000.

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Prieels, Jean-Paul; Maschelein, Charles; and Heilporn, Marc, 4,957,749, Cl. 426-10.000.

Olin Corporation: *See*—
French, Cheryl B.; and Breister, Sigmund, 4,957,658, Cl. 252-400.230.
Nelson, John D., 4,957,908, Cl. 514-55.000.

Olin Hunt Specialty Products Inc.: *See*—
Jeffries, Alfred T., III; Blakeney, Andrew J.; and Toukhy, Medhat A., 4,957,846, Cl. 430-165.000.

Olson, Jan B., to Elmwood Sensors, Inc. Contrast enhancing transparent touch panel device. 4,958,148, Cl. 340-712.000.

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Akitake, Horoshi, 4,958,177, Cl. 354-195.100.
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Buelt, James L.; and Oma, Kenton H., 4,957,393, Cl. 405-128.000.

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Wilson, William E.; Morton, Edward W.; and O'Mullan, Daniel W., 4,958,102, Cl. 313-1.000.

Omura, Etsuji; Goto, Katsuhiko; Takahashi, Shogo; Namba, Harumi; and Takemoto, Akira, to Mitsubishi Denki Kabushiki Kaisha. Method of making a semiconductor laser using superlattice disordering. 4,957,879, Cl. 437-129.000.

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Maegawa, Hiroji; and Omuta, Tatsuro, 4,957,051, Cl. 112-121.120.

O'Neill, James F., to Xerox Corporation. Method of using erodable masks to produce partially etched structures in ODE wafer structures. 4,957,592, Cl. 156-644.000.

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Tanaka, Kunio; Onishi, Yasushi; and Itsubo, Yoshihiro, 4,958,293, Cl. 364-474.030.

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Nakashima, Mitsuyoshi; Kanamaru, Mitsutaka; Sugiyama, Akira; Terakawa, Masato; Ono, Takaharu; and Horiai, Haruo, 4,957,923, Cl. 514-259.000.

Ono, Takayuki: *See*—
Koshi, Kiroyuki; Owada, Minoru; Minegishi, Hisako; and Ono, Takayuki, 4,957,366, Cl. 356-318.000.

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Harada, Norimichi; and Onoue, Akihiro, 4,957,460, Cl. 440-83.000.

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Komazawa, Osamu; Isogai, Shigetaka; Buma, Shuuichi; Onuma, Toshio; Yonekawa, Takashi; and Hattori, Katsuhiko, 4,957,309, Cl. 280-707.000.

Ooms, Adrianus J.: *See*—
Stil, Jacob H.; Ooms, Adrianus J.; and Mink, Bernardus H., 4,957,657, Cl. 252-373.000.

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Kobayashi, Junya; Oota, Masaaki; Kada, Katsuhiko; and Minakuchi, Hiroyoshi, 4,957,883, Cl. 501-35.000.

Ootsuka, Hiroshi: *See*—
Ishikawa, Norio; Nakai, Masaaki; Hirano, Masayasu; Fujino, Akihiko; Ootsuka, Hiroshi; Egawa, Takeshi; and Kawamura, Kunio, 4,958,181, Cl. 354-412.000.

Oppenheimer Companies: *See*—
Hale, Douglas B., 4,957,761, Cl. 426-410.000.

Oppenlander, Harry; and Druzela, Heiko, to Klockner-Becorit GmbH. Methods of translating a face support. 4,957,327, Cl. 299-11.000.

Orgel, Leslie E.: *See*—
Chu, Barbara; Kramer, Fred R.; Lizardi, Paul; and Orgel, Leslie E., 4,957,858, Cl. 435-6.000.

Orlandini, Giorgio. Cutting device for rolls of adhesive tape. 4,957,234, Cl. 225-65.000.

Orwick, Philip L.; and Templeton, Andrew R., to American Cyanamid Company. Method for increasing axillary branching, tillering, flowering and yield of agronomic and horticultural crops with certain 2-(2-imidazolin-2-yl)-pyridines and quinolines. 4,957,536, Cl. 71-92.000.

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Ando, Kenji; Kamiya, Osamu; Sugata, Masao; Kurihara, Noriko; Sugata, Hiroyuki; Den, Tohru; Kimura, Toshiaki; Hamamoto, Takashi; Haruta, Masahiro; and Osabe, Kuniji, 4,957,061, Cl. 118-719.000.

Osborne, Marion W.: *See*—
Cantu, Lisa A.; Osborne, Marion W.; and McBride, Edward F., 4,957,165, Cl. 166-295.000.

Oscar Mayer Foods Corporation: *See*—
Boeding, Mary B., 4,957,256, Cl. 248-225.100.

Oshita, Saiichiro; and Mouri, Toyohiko, to Fuji Jukogyo Kabushiki Kaisha. Electric power steering system. 4,957,181, Cl. 180-79.100.

Oskar Wortz & Inhaber Hans Woretz: *See*—
Bolliger, Roman, 4,957,452, Cl. 439-410.000.

Ota, Tadaki, to Nissan Motor Company, Ltd. Apparatus for controlling engine operable on gasoline/alcohol fuel blend. 4,957,087, Cl. 123-479.000.

Otis Elevator Company: *See*—
Nakanishi, Yoshinori, 4,957,191, Cl. 187-95.000.

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Torii, Sigeru; Tanaka, Hideo; Taniguchi, Masatoshi; Sasaoka, Michio; Saito, Norio; Shiroi, Takashi; Nagao, Shigemitsu; Kikuchi, Ryo; and Kameyama, Yutaka, 4,958,018, Cl. 540-215.000.

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Otsuka, Tatsuo: *See*—
Mizoguchi, Masaaki; Inoue, Susumu; Otsuka, Tatsuo; and Isoyama, Eizo, 4,957,159, Cl. 165-133.000.

Outboard Marine Corporation: *See*—
Remmers, Gregry M., 4,957,091, Cl. 123-602.000.

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Owen, Hartley; and Schipper, Paul H., to Mobil Oil Corporation. Fluid catalytic cracking. 4,957,617, Cl. 208-113.000.

Owen, Leonard J., to AMP Incorporated. Electrical socket. 4,957,453, Cl. 439-422.000.

Owens-Brockway Glass Container Inc.: *See*—
Juvinall, John W.; and Redmond, Robert C., 4,958,223, Cl. 358-106.000.

Owens-Illinois Closure Inc.: *See*—
Kusz, Maximillian, 4,957,210, Cl. 215-220.000.

Oyabu, Hajime: *See*—
Nakakura, Hirofumi; Shibata, Morio; Ishikawa, Haruo; Nakano, Akihisa; Hirota, Hiromi; and Oyabu, Hajime, 4,957,040, Cl. 99-348.000.

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Paccar Inc.: *See*—
Marlowe, Huston; Tao, Michikazu J.; and Pound, Virgil, 4,957,322, Cl. 296-180.200.

Pachmayr Ltd.: *See*—
Cupp, Carl J., 4,956,932, Cl. 42-74.000.

Pacia, Dante V., to Wells Manufacturing. Automatic food dispensing method, apparatus and utensil. 4,957,226, Cl. 222-643.000.

Pacific Consolidated Industries: *See*—
Zarate, Robert A.; Self, Richard E.; and Smith, Lee W., 4,957,523, Cl. 62-13.000.

Pacific northwest research & Development, Inc.: *See*—
Powell, Joseph P.; Bender, Donald L.; Saunders, Sam C.; Purnell, Larry W.; and Khattak, Anwar S., 4,958,306, Cl. 364-550.000.

Page, Loretta A. G., to DXImaging. Liquid electrostatic developer containing multiblock polymers. 4,957,844, Cl. 430-115.000.

Pahade, Ravindra F.; Ziemer, John H.; and Howell, John K., to Union Carbide Corporation. Air separation process with improved reboiler liquid cleaning circuit. 4,957,524, Cl. 62-18.000.

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Gaertner, Dean J.; and Palamara, Eugene J., 4,957,525, Cl. 65-1.000.

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Vogel, Robert A.; Berthiaume, William A.; and Palermo, Thomas J., 4,957,110, Cl. 128-642.000.

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Alphonse, Gerard A.; and Palfrey, Stephen L., 4,958,355, Cl. 372-45.000.

Palmer, Theodore R.: *See*—
Courchesne, Claude J. F.; and Palmer, Theodore R., 4,957,185, Cl. 182-150.000.

Panek, Claus-Peter: *See*—
Weiler, Rolf; Panek, Claus-Peter; and Schmidt, Bodo, 4,957,192, Cl. 188-71.900.

Panelbrick Industries PTY. Limited: *See*—
Boot, Phillip H., 4,957,685, Cl. 264-261.000.

Pangrazi, Ronald; Walker, James L.; and Mudge, Paul R., to National Starch and Chemical Investment Holding Corporation. Heat resistant acrylic binders for nonwovens. 4,957,806, Cl. 428-224.000.

Paperboard Industries Corporation: *See*—
Madonna, Louis; and Garrett, Chris, 4,957,237, Cl. 229-120.000.

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Sekmakas, Kazys; and Parenti, Aurelio, 4,957,952, Cl. 523-402.000.

Park, Seung C.: *See*—
Min, Suk K.; Park, Seung C.; and Han, Chul W., 4,957,711, Cl. 422-245.000.

Park, Won S.: *See*—
Marlett, Everett M.; Malcolm, Arcelio J.; and Park, Won S., 4,957,726, Cl. 423-644.000.

Parker, Richard D. Combination fluid collection and disposal apparatus. 4,957,491, Cl. 604-317.000.

Parker, Terry S., to GTE Mobilnet Incorporated. Customer activation system. 4,958,368, Cl. 379-91.000.

Parker, Tim: *See*—
Fitch, John J.; Parker, Tim; Bouchard, Alfred T., Jr.; and Sullivan, Mary, 4,958,173, Cl. 346-160.100.

Parkhomenko, Alexandr I.; Dzjuban, Vitaly S.; and Moskalev, Edward P., to Vsesojuzny Nauchno-Issledovatelsky Proektno-Konstruktorsky i Tekhnologichesky, Institut Vzryvozaschischennogo i Rudnichnogo Elektrooborudovaniya. Flame-proof electric device. 4,958,236, Cl. 361-331.000.

Parmentier, Michel; and Weber, Jean-Charles, to France Grignotage S.A.R.L. Apparatus for the removal of vapors and vapor products. 4,957,520, Cl. 55-269.000.

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Davidson, David L.; Parrent, George B., Jr.; Gubisch, Roland W.; and Hauer, Harold, 4,958,295, Cl. 364-497.000.

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Kendall, Paul W.; and Parrott, Gregory H., 4,958,290, Cl. 364-463.000.

Parsons, Ralph L., Jr. Boom mower attachment for a tractor adjustable for cutting at either side thereof. 4,956,965, Cl. 56-15.100.

Paserin, Vladimir: *See*—
Babjak, Juraj; Ettel, Victor A.; and Paserin, Vladimir, 4,957,543, Cl. 148-13.000.

Pasik, Gregory E.: *See*—
Wood, Robert J.; Slee, Earl H.; Pasik, Gregory E.; and Pileski, Michael J., 4,957,346, Cl. 350-96.260.

Pastan, Ira H.: *See*—
Bjorn, Michael J.; FitzGerald, David J.; Frankel, Arthur E.; Laird, Walter J.; Pastan, Ira H.; Ring, David B.; Willingham, Mark C.; and Windelhake, Jeffrey L., 4,958,009, Cl. 530-389.000.

Patarroyo, Manuel E. Protein copolymer malaria vaccine. 4,957,738, Cl. 424-88.000.

Paton, H. N. Tubular elastomeric spring having controllable breakover and spring rate. 4,957,277, Cl. 267-33.000.

Patterson, Roger L., to MacDon Industries Ltd. Header for a combine harvesting machine. 4,956,966, Cl. 56-181.000.

Patton, Bob J.; and Foster, C. Mackay, to Patton Consulting, Inc. Surveying method for locating target subterranean bodies. 4,957,172, Cl. 175-61.000.

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Patton, Bob J.; and Foster, C. Mackay, 4,957,172, Cl. 175-61.000.

Paul, Janice W., executrix: *See*—
Paul, Roy D., deceased; and Pollock, Walter, 4,957,415, Cl. 416-245.00R.

Paul Journee S.A.: *See*—
Journee, Maurice A., 4,956,890, Cl. 15-250.360.

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Pauly, Thomas E.; Van Doren, Jeffrey C.; Henessey, John P.; and Christiansen, James M., to Vistakon, Inc. Apparatus and method for satisfying disposable contact lens prescriptions. 4,958,280, Cl. 364-403.000.

Pauwels, Julian R., to Davis Water and Waste Industries, Inc. Traveling bridge filter with surface wash. 4,957,631, Cl. 210-264.000.

Payton, Spero: *See*—
Ries, Richard D.; Smith, Dewey W.; and Payton, Spero, 4,958,214, Cl. 357-74.000.

Peake, Steven L.: *See*—
Maranci, Artun; Peake, Steven L.; and Kaminski, Stanley S., 4,957,801, Cl. 428-147.000.

Pechhold, Engelbert, to Du Pont de Nemours, E. I., and Company. Modified fluorocarbonylimino biurets. 4,958,039, Cl. 556-421.000.

Pedersen, Thor: *See*—
Aune, Jan A.; and Pedersen, Thor, 4,957,551, Cl. 75-657.000.

Peemoller, Horst: *See*—
Alich, Thomas; Flisikowski, Peter; and Peemoller, Horst, 4,956,885, Cl. 5-431.000.

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Armen, Seth A., 4,957,444, Cl. 434-247.000.

Peil, Heinz G.: *See*—
Bohn, Manfred; Dittmar, Walter; Peil, Heinz G.; Futterer, Eberhard; and Kraemer, Karl, 4,957,730, Cl. 424-61.000.

Pellicori, Samuel F.; and Mika, Aram M., to Santa Barbara Research Center. Wedge-filter spectrometer. 4,957,371, Cl. 356-419.000.

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Kravetsky, Dmitry Y.; Zatulovsky, Lev M.; Egorov, Leonid P.; Pelts, Boris B.; Okun, Leonid S.; Freiman, Efim A.; Averyanov, Viktor V.; and Alishoev, Alexandr L., 4,957,713, Cl. 422-249.000.

Pelzer, Helmut. Lining and cover for automobiles. 4,957,796, Cl. 428-76.000.

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Penhale, Donald W. H.: *See*—
Heller, Jorge; Ng, Steve Y. W.; and Penhale, Donald W. H., 4,957,998, Cl. 528-220.000.

Pennison, Dennis J.: *See*—
Coyle, William E., Jr.; and Pennison, Dennis J., 4,957,002, Cl. 73-761.000.

Pennzoil Products Company: *See*—
Dohner, Brent R., 4,957,704, Cl. 422-14.000.

Pentapharm, Ltd.: *See*—
Wilder, Martin S., 4,957,740, Cl. 424-94.400.

Peppoloni, Samuele: *See*—
Nencioni, Luciano; Pileri, Piero; Peppoloni, Samuele; and Silvestri, Sergio, 4,957,736, Cl. 424-88.000.

Peranio, Anthony, to Purewater Sciences International, Inc. Method of and arrangement for purifying contaminated water. 4,957,624, Cl. 210-129.000.

Perez, Jose L. J., to Jesmar S. A. Doll with means for producing soap bubbles. 4,957,464, Cl. 446-16.000.

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Saur, Wolfgang; Schreiber, Herbert; Hilken, Gunter; and Peter, Rolf, 4,957,955, Cl. 524-114.000.

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Wagner, Wolf-Dietrich; Springer, Willi; Meissner, Ludwig; Bonfert, Helmut; Bottcher, Michael; Hardt, Thomas; Klumpp, Rolf; Krause, Klaus; Peters, Arndt; Plattner, Ernst; Strobel, Wolfgang; Waller, Wolfgang; and Wiemann, Gunter, 4,957,068, Cl. 123-41.82R.

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Lafferty, Robert M.; and Braunegg, Gerhart, 4,957,861, Cl. 435-146.000.

Pettingell, James T.; and Hollman, Kenneth F., to Micromanipulator Co., Inc., The. Probe assembly including touchdown sensor. 4,956,923, Cl. 33-558.000.

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Morsdorf, Peter; Schickaneder, Helmut; Herter, Rolf; Pfahlert, Volker; Engler, Heidrun; and Ahrens, Kurt H., 4,957,920, Cl. 514-252.000.

Pfau, Edward D.: *See*—
Brashier, Raymond W.; and Pfau, Edward D., 4,957,691, Cl. 376-245.000.

Pfeffer, John D.: *See*—
Chevalier, James L.; Pfeffer, John D.; and Brownell, Thomas F., 4,957,097, Cl. 126-373.000.

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Bohannan, William L.; Harrington, J. Vincent; and Pfister, John K., 4,956,999, Cl. 73-587.000.

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Millar, Huntly D., 4,957,111, Cl. 128-662.060.

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Heller, Jorge; Ng, Steve Y. W.; and Penhale, Donald W. H., 4,957,998, Cl. 528-220.000.

Philippe, Michel: *See*—
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Medler, Eberhard; Phillipi, Siefried; Vetter, Kurt; Freudenreich, Ludwig; and Lippuner, Othmar, 4,957,782, Cl. 427-421.000.

Phillips, Brian S.: *See*—
Barbee, Robert B.; and Phillips, Brian S., 4,957,814, Cl. 428-402.000.

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Harris, Michael R., 4,957,022, Cl. 83-16.000.
Hoover, Kenneth C.; Scoggins, Lacey E.; Shang, Wei-Tech W.; and Nesheiwat, Afif M., 4,958,004, Cl. 528-388.000.
Rachal, Duane M.; and Krone, James R., 4,957,432, Cl. 432-59.000.

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Wilder, Michael L.; Ruffalo, Michael A.; Lilly, George R.; and Hardy, William M., 4,956,896, Cl. 19-305.000.

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Smith, Tennyson, 4,957,368, Cl. 356-369.000.

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Verclyte, Eddy; Meyns, Ignace; and Glorie, Patrick, 4,957,145, Cl. 139-434.000.

Picard, Joseph A.; Roth, Bruce D.; and Sliskovic, Drago R., to Warner-Lambert Company. Trans-6-(2-(N-heteroaryl-3,5-disubstituted)-pyrazol-4-yl)-ethyl)-or ethenyl)tetrahydro-4-hydroxypyran-2-one inhibitors of cholesterol biosynthesis. 4,957,971, Cl. 514-252.000.

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Picollo, August J.; and Guillemette, Alfred N. Disposable curb inlet drain form. 4,957,268, Cl. 249-10.000.

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Schleifstein, Robert A.; and Pietrewicz, David S., 4,957,957, Cl. 524-169.000.

Pileri, Piero: *See*—
Nencioni, Luciano; Pileri, Piero; Peppoloni, Samuele; and Silvestri, Sergio, 4,957,736, Cl. 424-88.000.

Pileski, Michael J.: *See*—
Wood, Robert J.; Slee, Earl H.; Pasik, Gregory E.; and Pileski, Michael J., 4,957,346, Cl. 350-96.260.

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Pingel, Wayne H.; and Pingel, Donna M., 4,957,138, Cl. 137-549.000.

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Pioneer Electronic Corporation: *See*—
Hasegawa, Shinichi, 4,957,341, Cl. 350-254.000.

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Pisiotasa, Georg: *See*—
Bohner, Beat; Pisiotasa, Georg; and Moser, Hans, 4,957,535, Cl. 71-76.000.

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Dannatt, Hugh S., 4,957,179, Cl. 177-145.000.

Pittway Corporation: *See*—
Griess, Herbert C., 4,958,144, Cl. 340-606.000.

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Planta, William C., to Advanced Micro Devices, Inc. Complementary metal-oxide-semiconductor translator. 4,958,132, Cl. 330-110.000.

Plascore, Inc.: *See*—
Huebner, Fritz, 4,957,577, Cl. 156-197.000.

Plattner, Ernst: *See*—
Wagner, Wolf-Dietrich; Springer, Willi; Meissner, Ladwig; Bonfert, Helmut; Botticher, Michael; Hardt, Thomas; Klumpp, Rolf; Krause, Klaus; Peters, Arndt; Plattner, Ernst; Strobel, Wolfgang; Waller, Wolfgang; and Wiemann, Gunter, 4,957,068, Cl. 123-41.82R.

Platzer, Dieter: *See*—
Fortnagel, Manfred; and Platzer, Dieter, 4,956,973, Cl. 60-605.200.

Plundo, Robert A.: *See*—
Nebesh, Eugene; Plundo, Robert A.; and McMahon, Steven L., 4,957,895, Cl. 502-228.000.

Pochmarski, Luzian: *See*—
von Bogdandy, Ludwig; Mitter, Gerhard; Koller, Otto; Pochmarski, Luzian; Jaquemar, Christian; and Langhammer, Hans-Jurgen, 4,957,547, Cl. 75-567.000.

Poduje, Noel S.; and Mallory, Roy E., to ADE Corporation. Prealigner probe. 4,958,129, Cl. 324-661.000.

Pointurier, Hubert: *See*—
Lehmann, Hanno; Wasen, Iloi; and Pointurier, Hubert, 4,957,751, Cl. 426-36.000.

Poix, Rene : *See*—
Dewitte, Philippe; Canaud, Michel; and Poix, Rene , 4,957,572, Cl. 156-109.000.

Polan, George S., to Central Sprinkler Corporation. Sprinkler valve assembly. 4,957,169, Cl. 169-37.000.

Pollock, Walter: *See*—
Paul, Roy D., deceased; and Pollock, Walter, 4,957,415, Cl. 416-245.00R.

Polstra, John D.: *See*—
White, Bruce T.; Polstra, John D.; and Johnson, Craig V., 4,958,347, Cl. 371-29.500.

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Samarut, Jacques; Verdier, Gerard; Benchaibi, Miloud; Savatier, Pierre; Poncet, Didier; Flamant, Frederic; Xiao, Jiao-Hao; Thoraval, Pierrick; Chambonnet, Frederique; and Nigon, Victor, 4,957,865, Cl. 435-235.000.

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Lahr, Helfrid; and Pontani, Bernd, 4,957,692, Cl. 376-260.000.

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Pottebaum, Joseph R., to A. O. Smith Corporation. Wide range, self-starting single phase motor speed control. 4,958,118, Cl. 318-727.000.

Pound, Virgil: *See*—
Marlowe, Huston; Tao, Michikazu J.; and Pound, Virgil, 4,957,322, Cl. 296-180.200.

Powell, Charles F.: *See*—
Harrold, David O.; and Powell, Charles F., 4,956,995, Cl. 73-146.000.

Powell, Harry C., Jr., to Powell Machinery, Inc. Self-singulating weight sizer. 4,957,619, Cl. 209-539.000.

Powell, John M., to Chevron Research Company. Apparatus and method for measuring reservoir pressure changes. 4,957,001, Cl. 73-716.000.

Powell, Joseph P.; Bender, Donald L.; Saunders, Sam C.; Purnell, Larry W.; and Khattak, Anwar S., to Pacific northwest research & Development, Inc. Pavement inspection apparatus. 4,958,306, Cl. 364-550.000.

Powell Machinery, Inc.: *See*—
Powell, Harry C., Jr., 4,957,619, Cl. 209-539.000.

PPG Industries, Inc.: *See*—
Gaertner, Dean J.; and Palamara, Eugene J., 4,957,525, Cl. 65-1.000.
Reinhardt, Linda P.; and Burleson, W. Brent, 4,957,787, Cl. 428-24.000.

Prater, Stephen J. Apparatus and method for assisting a disabled person to hand write with a writing instrument. 4,957,442, Cl. 434-166.000.

Pratt, Vanon D.: *See*—
Scheidt, Wilbur D.; Whitney, Eric J.; and Pratt, Vanon D., 4,958,058, Cl. 219-121.600.

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Iida, Yukiari, 4,956,981, Cl. 66-20.000.

Precision Pulley, Inc.: *See*—
Valster, Karl C.; and Reicks, Allen V., 4,956,914, Cl. 29-892.100.

Preg, Robert. Universal tool holder. 4,956,912, Cl. 29-730.000.

Prepaid Card Services, Inc.: *See*—
Weinberger, Zvi, 4,958,065, Cl. 235-455.000.

Previdoli, Felix: *See*—
Mettler, Hans P.; Griffiths, Gareth; Mills, Lester; and Previdoli, Felix, 4,958,044, Cl. 558-431.000.

Price, John T.; and Kruse, Jurgen M. Magnetically controllable couplings containing ferrofluids. 4,957,644, Cl. 252-62.520.

Price, Scott D.: *See*—
Meredith, Daryl S.; and Price, Scott D., 4,957,831, Cl. 429-121.000.

Prieels, Jean-Paul; Maschelein, Charles; and Heilporn, Marc, to Oleofina, S.A. Process for removing oxygen in foodstuffs and drinks. 4,957,749, Cl. 426-10.000.

Priem, Curtis; Malachowsky, Chris; and Webber, Thomas, to Sun Microsystems, Inc. Multiplexor implementation for raster operations including foreground and background colors. 4,958,146, Cl. 340-703.000.

Primary Delivery Systems, Inc.: *See*—
Weinstein, Jack, 4,957,385, Cl. 401-132.000.

Primm, Alfred E., to Shiley, Inc. Method for producing tubing useful as a tapered vascular graft prosthesis. 4,957,669, Cl. 264-23.000.

Priority Mfg. Corp.: *See*—
Lakso, Matthew L., 4,957,334, Cl. 312-221.000.

Prisbylla, Michael P., to ICI Americas Inc. Process for the preparation of 5-substituted-3-phenyl imidazolidine-2,4-diones. 4,958,028, Cl. 548-309.000.

Pritchard, Thomas B., to Hewlett-Packard Company. Electrostatic discharge and electromagnetic interference protection circuit. 4,958,255, Cl. 361-212.000.

Probst, Harry C.; and Bloemers, James L., to Brunswick Corporation. Control system for the hydraulic tilt function of a marine engine. 4,957,457, Cl. 440-61.000.

Procal: *See*—
Saxod, Michel; Devoussoux, Serge; Marchiset, Michel; and Jaumot, Jean-Pierre, 4,957,680, Cl. 264-161.000.

Producers Color Service, Inc.: *See*—
Hennessey, Michael E., 4,957,603, Cl. 204-192.270.

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Profold, Inc.: *See*—
Brabant, Yvan E., 4,957,284, Cl. 270-37.000.

Prokupetz, Boris: *See*—
Lipsker, Yitshaq; and Prokupetz, Boris, 4,957,175, Cl. 175-94.000.

Proni, Oscar; Fayer, Ervin; and Dominick, George G., to Coulter Electronics, Inc. Fluid sampling and transfer valve assembly. 4,957,008, Cl. 73-864.830.

Pronk, Cornelis, to Lips B. V. Flow guiding face(s) for a ship. 4,957,458, Cl. 440-66.000.

Pross, Walter: *See*—
Burst, Hermann; Duwel, Klaus-Roger; Scheyhing, Ulrich; Pross, Walter; and Petri, Horst, 4,956,979, Cl. 62-244.000.

Protectair Limited: *See*—
Young, David E.; and Davis, Kenneth P., 4,957,103, Cl. 128-78.000.

Provazek, Lionel D.: *See*—
Chen, Shin C.; and Provazek, Lionel D., 4,958,243, Cl. 360-51.000.

Pruett, Wayne P.: *See*—
Weaver, Max A.; Pruett, Wayne P.; and Hilbert, Samuel D., 4,958,043, Cl. 558-403.000.

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Dimitrov, Dimiter A.; Dakov, Mincho S.; Tonchev, Dancho T.; Kalafirov, Hristo A.; Botev, Todor S.; Shterev, Krassimir E.; Kojuharov, Vladimir S.; Dimitrov, Yordan I.; and Tzvetkov, Dimiter V., 4,957,529, Cl. 65-112.000.

Public Health Laboratory Service Board: *See*—
Sutton, Peter M.; Atkinson, Anthony; and Lloyd, Graham, 4,957,910, Cl. 514-182.000.

Pullman, Gerald S.: *See*—
Gupta, Pramod K.; and Pullman, Gerald S., 4,957,866, Cl. 435-240.400.

Purdy, Harold L.: *See*—
Lisak, Stephen P.; and Purdy, Harold L., 4,956,942, Cl. 49-502.000.

Purewater Sciences International, Inc.: *See*—
Peranio, Anthony, 4,957,624, Cl. 210-129.000.

Puri, Atul: *See*—
Haskell, Barin G.; and Puri, Atul, 4,958,226, Cl. 358-136.000.

Purnell, Larry W.: *See*—
Powell, Joseph P.; Bender, Donald L.; Saunders, Sam C.; Purnell, Larry W.; and Khattak, Anwar S., 4,958,306, Cl. 364-550.000.

Pussikeskus Oy: *See*—
Janhonen, Veikko I., 4,956,961, Cl. 53-176.000.

Puttock, Michael C., to Thorn EMI Electronics Limited. Projectile. 4,957,046, Cl. 102-489.000.

Qinghua University: *See*—
Fang, Hongsheng; Zheng, Yankang; Chen, Xiuyun; Chen, Donghao; and Zhao, Rufa, 4,957,702, Cl. 420-104.000.

Quaker Oats Company, The: *See*—
Finnerty, Suja P.; and Lenz, Marvin K., 4,957,762, Cl. 426-457.000.

Quan, Clifton: *See*—
Olson, Mark; and Quan, Clifton, 4,957,456, Cl. 439-578.000.

Quantum Chemical Corporation: *See*—
Chang, Biau-Hung; and Kwiatek, Jack, 4,957,997, Cl. 528-220.000.

Quayle, William H.: *See*—
Wieserman, Larry F.; Wefers, Karl; Cross, Kathryn; Martin, Edward S.; Hsieh, H. Philip; and Quayle, William H., 4,957,890, Cl. 502-4.000.

Quinetics Corporation: *See*—
Ashbrook, Clifford L.; and Scarborough, Douglas B., 4,957,626, Cl. 210-695.000.

R. A. Jones & Co. Inc.: *See*—
Jones, Wickliffe, deceased; Scarpa, Eric W.; Greenwell, Joseph D.; Nease, Mark R.; Kalany, Robert M.; and Myers, Michael E., 4,956,964, Cl. 53-570.000.

Raasch, Hans, to W. Schlafhorst & Co. Method and apparatus for controlling the supply of sliver to the spinning stations of a spinning machine. 4,956,969, Cl. 57-281.000.

Rachal, Duane M.; and Krone, James R., to Phillips Petroleum Company. Forced jet convection oven for vacuum bagging. 4,957,432, Cl. 432-59.000.

Rade, Dieter: *See*—
Rademachers, Jakob; Rade, Dieter; Hofs, Hans-Ulrich; Teichmann, Gunther; and Trenczek, Gerhard, 4,957,562, Cl. 106-453.000.

Rademacher, Thomas W.: *See*—
Jacob, Gary S.; Tyms, A. Stanley; Rademacher, Thomas W.; and Dwek, Raymond A., 4,957,926, Cl. 514-315.000.

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Radlowski, Cecelia A.: *See*—
Yoo, Jin S.; Karch, John A.; Bhattacharyya, Alakananda A.; and Radlowski, Cecelia A., 4,957,718, Cl. 423-244.000.

Radomsky, John, to Cyclean. Method and apparatus for treating asphaltic concrete paving materials. 4,957,434, Cl. 432-103.000.

Radon Home Products, Inc.: *See*—
Jarnagin, Jerry; and Dawson, Dennis W., 4,957,394, Cl. 405-128.000.

Radtchenko, Konstantin. Artificial lure. 4,956,933, Cl. 43-42.500.

Radvan, Bronislaw: *See*—
Biggs, Ian S.; and Radvan, Bronislaw, 4,957,805, Cl. 428-223.000.

Rafaniello, William: *See*—
Knudsen, Arne K.; and Rafaniello, William, 4,957,884, Cl. 501-87.000.

Raleigh, William F., to Gas Research Institute. Self-clamping baffle for tubular structures. 4,957,160, Cl. 165-160.000.

Ramage, Michel: *See*—
Eleouet, Bernard; Ramage, Michel; and Rongier, Gilles, 4,957,810, Cl. 428-306.600.

Ramsey Foundation: *See*—
Wysham, Douglas G., 4,957,117, Cl. 604-95.000.

Ranby, Mats G., to Biopool International, Inc. Pharmaceutical and clinical compositions of desAA fibrin monomers and the tetrapeptide gly-pro-arg-pro. 4,957,903, Cl. 514-18.000.

Rascov, Anthony J. Compressor. 4,957,419, Cl. 417-273.000.

Rashleigh, Scott C.: *See*—
Thorncraft, David A.; Kennedy, David R.; Rashleigh, Scott C.; and Dabbs, Timothy P., 4,957,338, Cl. 350-96.150.

Raskin, Donald: *See*—
Khanarian, Garo; Raskin, Donald; Buckley, Alan; Calundann, Gordon W.; and East, Anthony J., 4,957,655, Cl. 252-299.010.

Ratcliffe, Ronald W., to Merck & Co., Inc. 7 Acylamidocarbacephem antibacterial agents. 4,957,912, Cl. 514-210.000.

Rathmayr, Heinz; Kronberger, Maximilian; and Drummer, Eugen, to Voest-Alpine Automotive Gesellschaft m.b.h. Pump nozzle for diesel engines. 4,957,090, Cl. 123-501.000.

Rauch, Manfred, to Fromm Holding AG. Apparatus for placing a strip of thermoplastic material around an object. 4,957,587, Cl. 156-495.000.

Raychem Corporation: *See*—
Stewart, Ray F.; and Thompson, James C., 4,957,612, Cl. 204-196.000.

Rayner Dennis R.: *See*—
Geffken, Detlef; and Rayner Dennis R., 4,957,933, Cl. 514-376.000.

Raytheon Company: *See*—
St. Hilaire, Kelly L., 4,957,513, Cl. 55-16.000.

RCA Inc.: *See*—
Alphonse, Gerard A.; and Palfrey, Stephen L., 4,958,355, Cl. 372-45.000.

RCS Industries, Inc.: *See*—
Sorensen, Robert C.; and Hendrickson, Thomas S., 4,958,266, Cl. 362-310.000.

Reading Technologies, Inc.: *See*—
Daniels, Keith L., 4,957,516, Cl. 55-218.000.

Rebenne, Helen E.: *See*—
Sarin, Vinod K.; D'Angelo, Charles; and Rebenne, Helen E., 4,957,780, Cl. 427-255.200.

Recher, Gilles: *See*—
Diard, Jean-Luc; Grandjacques, Philippe; and Recher, Gilles, 4,957,304, Cl. 280-609.000.

Reddy, Premkumar E.: *See*—
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Redmond, Robert C.: *See*—
Juvinall, John W.; and Redmond, Robert C., 4,958,223, Cl. 358-106.000.

Reetz, William R., to T J International, Inc. Span-adjustable open-web support bracket. 4,957,186, Cl. 248-296.000.

Regnier, Kent E.: *See*—
Stanevich, Kenneth W.; and Regnier, Kent E., 4,957,448, Cl. 439-326.000.

Reher, James F.; and Farzin-Nia, Farrokh, to Manufacturers Hanover Trust Co. Ultrasonic machining tool for machining orthodontic brackets. 4,957,550, Cl. 75-246.000.

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Reicks, Allen V.: *See*—
Valster, Karl C.; and Reicks, Allen V., 4,956,914, Cl. 29-892.100.

Reif, L. Rafael: *See*—
Ilderem, Vida; Reif, L. Rafael; and Tedrow, Prabha K., 4,957,777, Cl. 427-55.000.

Reijnders, Nicolaas H. G.: *See*—
Hendrix, Machiel A. M.; Scheepers, Johannes A. M.; and Reijnders, Nicolaas H. G., 4,958,106, Cl. 315-208.000.

Reilly, Douglas L.; Scofield, Christopher L.; Cooper, Leon N.; and Elbaum, Charles, to Nestor, Inc. Parallel, multi-unit, adaptive pattern classification system using inter-unit correlations and an intra-unit class separator methodology. 4,958,375, Cl. 382-14.000.

Reinhardt, Linda P.; and Burleson, W. Brent, to PPG Industries, Inc. Artificial flower. 4,957,787, Cl. 428-24.000.

Reinhart, Douglas M.: *See*—
Gonser, Donald I.; and Reinhart, Douglas M., 4,957,483, Cl. 604-30.000.

Relange, Dominique. Device for sealing the mobile elements of an artillery recoil brake. 4,957,033, Cl. 89-43.010.

Reliance Comm/Tec Corporation: *See*—
Gilberts, Alexander G.; and Rust, Wayne, 4,958,253, Cl. 361-119.000.
Remmers, Gregry M., to Outboard Marine Corporation. Dual schedule ignition system. 4,957,091, Cl. 123-602.000.
Remp, Thomas E.: *See*—
Dreyfuss, Wilfried; Remp, Thomas E.; and Muller, Kurt, 4,957,141, Cl. 138-89.000.
Resilient System, Inc.: *See*—
Bogdany, John, 4,957,798, Cl. 428-95.000.
Reuther, Wolfgang: *See*—
Schuetz, Franz; Sauter, Hubert; Brand, Siegbert; Wenderoth, Bernd; Baus, Ulf; Reuther, Wolfgang; Lorenz, Gisela; and Ammermann, Eberhard, 4,957,937, Cl. 514-407.000.
Reyes, Clyde L. Five in one cooker. 4,957,039, Cl. 99-340.000.
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Eskam, Armin; Frye, Gunter; and Krumm, Herbert, 4,957,035, Cl. 89-8.000.
Rheon Automatic Machinery Co., Ltd.: *See*—
Hayashi, Torahiko, 4,957,426, Cl. 425-367.000.
Rhodes, Richard O. Ring launching method and apparatus. 4,957,092, Cl. 124-20.100.
Richards, Anthony L.: *See*—
Hibbert, David A.; Harton, Lynn M.; Anderson, John D.; and Richards, Anthony L., 4,957,447, Cl. 439-207.000.
Richardson, Royest L. Balloon toy and game. 4,957,299, Cl. 273-409.000.
Richardson, William F.: *See*—
Teng, Clarence W.; Richardson, William F.; Doering, Robert R.; Shah, Ashwin H.; Shen, Bing W.; and Bordelon, Mark, 4,958,212, Cl. 357-54.000.
Richter, Alfred H., to Richter Manufacturing Corporation. Packing sleeve. 4,957,791, Cl. 428-35.500.
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Richter, Alfred H., 4,957,791, Cl. 428-35.500.
Ricoh Company, Ltd.: *See*—
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Kruse, James W.; and Riley, Donald E., 4,957,359, Cl. 350-637.000.
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Cuomo, Andrea; Diazzi, Claudio; and Rischmuller, Klaus, 4,958,121, Cl. 323-224.000.
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Boguslavsky, Alexandr M.; Semenikhin, Viktor F.; Chergikalo, Vladimir I.; Rozenman, Lev I.; Tregub, Yakov K.; Risman, Arkady I.; Topopolsky, Yankel M.; Khatanzeisky, Egor V.; and Rubin, Eduard A., 4,957,058, Cl. 118-323.000.
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Koever, Laszlo; Rittersdorf, Walter; and Werner, Wolfgang, 4,957,872, Cl. 436-175.000.
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Kramer, Manfred; and Sitter, Erhard, 4,957,084, Cl. 123-447.000.
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Roberts, Thomas E.; and Hwang, Yeongming, to Ford Aerospace Corporation. Near isotropic circularly polarized antenna. 4,958,162, Cl. 343-700.0MS.
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Martin, Neil F.; and Robinson, Howard N., 4,957,918, Cl. 514-235.800.
Robinson, James L. Animal waste flushing assembly. 4,957,131, Cl. 134-175.000.
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Roger, Labouseffe, to Solex. Fuel injection device with air chamber. 4,957,241, Cl. 239-409.000.
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Rohloff, Pete, to Ingersoll-Rand Company. Baffle plate for water purification reservoir. 4,957,621, Cl. 210-171.000.
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Maroldo, Stephen G.; Betz, William R.; and Borenstein, Noah, 4,957,897, Cl. 502-432.000.
Rohym GmbH: *See*—
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della Valle, Francesco; and Romeo, Aurelio, 4,957,744, Cl. 424-401.000.
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Amedei, Giuseppe; and Rondelli, Angelo, 4,957,016, Cl. 74-336.00R.
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Eleouet, Bernard; Ramage, Michel; and Rongier, Gilles, 4,957,810, Cl. 428-306.600.
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Speedie, Robert, 4,956,897, Cl. 24-134.00P.
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Harris, Stephen J.; Woods, John G.; Rooney, John M.; MacManus, Marueen G.; and Guthrie, John, 4,957,960, Cl. 524-243.000.
Rosanio, Louis G., Jr.: *See*—
Koskol, Joseph E.; Santucci, Robert J.; and Rosanio, Louis G., Jr., 4,956,901, Cl. 28-255.000.
Rose, Robert D., Jr. Computer disk holder. 4,957,205, Cl. 206-444.000.

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Gries, Heinz; Rosenberg, Douwe; and Weinmann, Hanns-Joachim, 4,957,939, Cl. 514-492.000.

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Rosenberg, Peretz. Rotary sprinklers. 4,957,240, Cl. 239-233.000.

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Liang, Marc D.; Narayanan, Krishna; and Ross, Eugene D., 4,957,500, Cl. 606-157.000.

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Ojha, Sureshchandra M.; Rosser, Paul J.; and Moynagh, Philip B., 4,957,873, Cl. 437-20.000.

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Steeg, Michael; Neuhaus, Peter; Roth, Albert; and Engel, Ulrich, 4,957,822, Cl. 428-653.000.

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Picard, Joseph A.; Roth, Bruce D.; and Sliskovic, Drago R., 4,957,971, Cl. 514-252.000.

Roth, Maxim; Godwin, Jimmy D.; and Williams, Roger O., to Insite Peripherals, Inc. Apparatus and method for optical servo control with media having information storage and servo control regions of different reflectivities. 4,958,245, Cl. 360-77.030.

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Akbar, Shah; Kroesen, Patricia L.; Ogura, Seiki; and Rovedo, Nivo, 4,957,875, Cl. 437-31.000.

Roy, Judith A.: *See*—
Roy, William C.; Roy, Judith A.; and Edmisson, Russell C., 4,957,253, Cl. 248-104.000.

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Bernier, Robert J.; Buhler-Vidal, Jorge O.; Haapala, Urho S.; and Rozenblat, Benjamin R., 4,958,006, Cl. 528-501.000.

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Boguslavsky, Alexandr M.; Semenikhin, Viktor F.; Chergikalo, Vladimir I.; Rozenman, Lev I.; Tregub, Yakov K.; Risman, Arkady I.; Topopolsky, Yankel M.; Khatanzeisky, Egor V.; and Rubin, Eduard A., 4,957,058, Cl. 118-323.000.

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Ivanova, Lilia N.; Rozhkova, Irina V.; Semenikhina, Vera F.; Knyazeva, Tatyana N.; and Chagarovsky, Alexandr P., 4,957,752, Cl. 426-43.000.

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Ruby, Gary V.: *See*—
Flora, Laurence P.; and Ruby, Gary V., 4,958,351, Cl. 371-40.100.

Rudolph, Matthias, to Siemens Aktiengesellschaft. Nuclear reactor fuel assembly. 4,957,695, Cl. 376-364.000.

Ruffalo, Michael A.: *See*—
Wilder, Michael L.; Ruffalo, Michael A.; Lilly, George R.; and Hardy, William M., 4,956,896, Cl. 19-305.000.

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Guillon, Jean-Claude; and Rufray, Jean-Claude, 4,958,229, Cl. 358-180.000.

Ruggeberg, Klaus; and Jose, Horst-Udo, to Varta Batterie Aktiengesellschaft. Plastic sealing element for a galvanic primary cell. 4,957,832, Cl. 429-164.000.

Rummage, Tony F.; Wise, John T.; Foehrenbach, Charles D.; and Cunningham, McCleery B., to Sonoco Products Company. Concrete column forming tube. 4,957,270, Cl. 249-48.000.

Rumph, George W.; and Anstey, Henry D., to Deere & Company. Housing for holding a supply roll of large round bale wrap material. 4,956,959, Cl. 53-118.000.

Rumph, George W.: *See*—
Anstey, Henry D.; and Rumph, George W., 4,956,960, Cl. 53-118.000.

Rust, Wayne: *See*—
Gilberts, Alexander G.; and Rust, Wayne, 4,958,253, Cl. 361-119.000.

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Sadis Bruker Spectrospin, S.A.: *See*—
Brevard, Christian; Coutures, Jean-Pierre; Massiot, Dominique; Rifflet, Jean-Claude; and Taulelle, Francis, 4,958,126, Cl. 324-318.000.

Saegusa, takeo; Miyamoto, Masatoshi; and Sano, Yoshiyuki, to Daikin Industries, Ltd. Fluorine-containing compositions and process for preparing the same from cyclic iminoethers. 4,958,005, Cl. 528-408.000.

Safety Operating Systems, Inc.: *See*—
Morris, James A., 4,958,145, Cl. 340-689.000.

Sagara, Kazuhiko: *See*—
Homma, Noriyuki; Nakamura, Tohru; Nakazato, Kazuo; Matsumoto, Motoaki; Hayashida, Tetsuya; Kubo, Masaharu; and Sagara, Kazuhiko, 4,958,320, Cl. 365-174.000.

Saint-Gobain Vitrage: *See*—
Dewitte, Philippe; Canaud, Michel; and Poix, Rene , 4,957,572, Cl. 156-109.000.
Letemps, Bernard; Leclerco, Jacques; and Dereims, Philippe, 4,957,528, Cl. 65-104.000.

St. Hilaire, Kelly L., to Raytheon Company. Method of purifying a mixed H_2/H_2Se vapor stream. 4,957,513, Cl. 55-16.000.

St. John, Richard C. Adjustable locked center and dynamic tensioner. 4,957,471, Cl. 474-133.000.

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Saito, Kenji: *See*—
Takisawa, Yukihisa; Kono, Nobuharu; Saito, Kenji; and Yamachika, Hiroshi, 4,958,033, Cl. 549-59.000.

Saito, Norio: *See*—
Torii, Sigeru; Tanaka, Hideo; Taniguchi, Masatoshi; Sasaoka, Michio; Saito, Norio; Shiroi, Takashi; Nagao, Shigemitsu; Kikuchi, Ryo; and Kameyama, Yutaka, 4,958,018, Cl. 540-215.000.

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Kikuchi, Tohru; Fujita, Toshiyuki; Saito, Takayuki; Kojima, Mitsumasa; Sato, Hidetaka; and Suzuki, Hiroshi, 4,958,001, Cl. 528-346.000.

Saito, Yasuhisa; Watanabe, Katsuya; Okuno, Kohichi; Kamio, Kunimasa; and Morii, Akira, to Sumitomo Chemical Company, Limited. Low-viscosity epoxy resin, and fiber-reinforced composite material based on m-alkyl triglycidylaminophenols. 4,957,995, Cl. 528-99.000.

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Saitoh, Nobuhiro, to Toshiba Silicone Co., Ltd. Vehicle for slow dissolving coating material. 4,957,989, Cl. 526-279.000.

Saitoh, Shiroh; Izumi, Mamoru; Suzuki, Syuzi; and Abe, Kazuhide, to Kabushiki Kaisha Toshiba. Ultrasonic imaging apparatus. 4,958,327, Cl. 367-7.000.

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Sakai, Kiyoharu; and Hori, Masaaki, to Brother Kogyo Kabushiki Kaisha. Paper feeding and cutting control device in a recording apparatus. 4,957,381, Cl. 400-621.000.

Sakai, Kunihiro: *See*—
Tomida, Yoshinori; Matsuda, Hiroshi; Sakai, Kunihiro; Nishimura, Yukuo; Nakagiri, Takashi; and Miyazaki, Toshihiko, 4,957,851, Cl. 430-272.000.

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Fukao, Masuzo; Sakai, Tadashi; and Murohashi, Kozo, 4,957,409, Cl. 414-788.400.

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Sugawara, Ken; Nakamura, Katsujiro; Matoba, Mikio; and Sakairi, Shigeru, 4,958,323, Cl. 365-189.010.

Sakamaki, Yoshiyuki: *See*—
Iizuka, Shunichi; Sakamaki, Yoshiyuki; and Shimoyama, Noriyuki, 4,957,954, Cl. 524-102.000.

Sakamoto, Kiyoshi: *See*—
Fujii, Sigezo; Uesugi, Tsuneya; and Sakamoto, Kiyoshi, 4,957,530, Cl. 65-172.000.

Sakamoto, Nagahiro, to Hoya Corporation. Inspecting apparatus capable of accurately inspecting an object. 4,958,083, Cl. 250-572.000.

Sakamoto, Norio: *See*—
Nakamura, Masao; Sakamoto, Norio; and Ito, Takashi, 4,957,247, Cl. 242-67.10R.

Sakamoto, Sadao: *See*—
Higuchi, Masahiro; Sakamoto, Sadao; and Uchihara, Yoshiharu, 4,957,776, Cl. 427-54.100.

Sakamoto, Yoshinori: *See*—
Fujinawa, Shohei; Sakamoto, Yoshinori; and Iizuka, Harumasa, 4,958,017, Cl. 536-124.000.

Sakashita, Kiichiro; Nakahara, Toshiaki; Tanikawa, Hirohide; Matsushige, Naoki; Yoshida, Satoshi; Fujiwara, Masatsugu; and Mitsuhashi, Yasuo, to Canon Kabushiki Kaisha. Developer and image forming device. 4,957,840, Cl. 430-106.600.

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Sakuma, Kuniharu; Honda, Hiroshi; Maehata, Koukichi; and Aikawa, Takayuki, to Agency of Industrial Science and Technology. Method for three dimensional sewing of suit coat body and sleeves therefor. 4,957,054, Cl. 112-262.200.

Sakuma, Yoichi; and Umezawa, Chieko, to Asahi Glass Company Ltd. Light energy transmitting optical fiber cable. 4,957,345, Cl. 350-96.230.

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Ohmae, Tadayuki; Sakurai, Tadashi; Yamaguchi, Noboru; Okada, Mitsuyuki; and Asao, Kouichiro, 4,957,660, Cl. 252-500.000.

Sakurai, Takayasu, to Kabushiki Kaisha Toshiba. Semiconductor memory device having a function of simultaneously clearing part of memory data. 4,958,326, Cl. 365-218.000.

Salk Instute for Biological Studies, The: *See*—
Chu, Barbara; Kramer, Fred R.; Lizardi, Paul; and Orgel, Leslie E., 4,957,858, Cl. 435-6.000.

Salomon S.A.: *See*—
Diard, Jean-Luc; Grandjacques, Philippe; and Recher, Gilles, 4,957,304, Cl. 280-609.000.

Salvin, Roger P.: *See*—
Meier, Kurt; and Salvin, Roger P., 4,957,946, Cl. 522-59.000.

Samarut, Jacques; Verdier, Gerard; Benchaibi, Miloud; Savatier, Pierre; Poncet, Didier; Flamant, Frederic; Xiao, Jiao-Hao; Thoraval, Pierrick; Chambonnet, Frederique; and Nigon, Victor, to Institut National de la Recherche Agronomique (INRA). Cloning or expression vectors containing the avian erythroblastosis virus genome and cells transfected by these vectors. 4,957,865, Cl. 435-235.000.

Sampson, Scott D.: *See*—
Fulton, Alfred L.; Lakhani, Kishor M.; Sampson, Scott D.; and Lowman, Kent, 4,958,171, Cl. 346-153.100.

Samsung Aerospace Industries, Ltd.: *See*—
Ku, Bon J.; and Jung, Hyun W., 4,958,176, Cl. 354-173.110.

Samsung Electronics Co., Ltd.: *See*—
Shim, Jae E., 4,958,055, Cl. 219-10.55B.

Samuelson, Bruce E., to Minnesota Mining and Manufacturing Company. Tape dispenser. 4,957,233, Cl. 225-26.000.

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Nishio, Taichi; Abe, Hiroomi; Suzuki, Yasurou; Sanada, Takashi; Hosoda, Satoru; and Okada, Takayuki, 4,957,966, Cl. 525-66.000.

Sandberg, John A.: *See*—
Jonsson, Ulf E.; Sandberg, John A.; and Sjogren, John A., 4,957,745, Cl. 424-461.000.

Sanden Corporation: *See*—
Nobuyasu, Ando, 4,957,158, Cl. 165-110.000.

Sander, Willy M.: *See*—
Freer, Raymond F.; and Sander, Willy M., 4,958,367, Cl. 379-84.000.

Sandre, Giovanni: *See*—
Neri, Carlo; Nodari, Nereo; Bersanetti, Erik; and Sandre, Giovanni, 4,957,956, Cl. 524-120.000.

Sankei Pharmaceutical Co., Ltd.: *See*—
Shimizu, Shigeo; and Takano, Hiroyuki, 4,958,019, Cl. 540-226.000.

Sanko Senzai Kogyo Kabushiki Kaisha: *See*—
Komura, Syoichi; and Toyofuku, Hiroyuki, 4,957,278, Cl. 267-166.000.

Sano, Kunio: *See*—
Imamura, Seiichiro; Terui, Sadao; Sano, Kunio; Nishikawa, Kazuyoshi; and Inoue, Akira, 4,957,717, Cl. 423-240.000.

Sano, Yoshiyuki: *See*—
Saegusa, takeo; Miyamoto, Masatoshi; and Sano, Yoshiyuki, 4,958,005, Cl. 528-408.000.

Sanofi: *See*—
Creuly, Catherine; Gros, Jean-Bernard; and Larroche, Christian, 4,957,862, Cl. 435-148.000.
Gubin, Jean; Chatelain, Pierre; Descamps, Marcel; Nisato, Dino; Inion, Henri; Lucchetti, Jean; Mahaux, Jean-Marie; and Vallat, Jean-Noel, 4,957,925, Cl. 514-299.000.

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Harada, Norimichi; and Onoue, Akihiro, 4,957,460, Cl. 440-83.000.

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Kohno, Yoshihiro; and Iida, Kazumi, 4,957,664, Cl. 261-34.200.
Nakamura, Kazuhiro; Yoshioka, Tatsuya; Sawada, Ryoji; and Nakamura, Tomoji, 4,956,997, Cl. 73-182.000.
Nakayama, Manabu, 4,957,461, Cl. 440-89.000.

Santa Barbara Research Center: *See*—
Pellicori, Samuel F.; and Mika, Aram M., 4,957,371, Cl. 356-419.000.

Santucci, Robert J.: *See*—
Koskol, Joseph E.; Santucci, Robert J.; and Rosanio, Louis G., Jr., 4,956,901, Cl. 28-255.000.

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Higuchi, Masahiro; Sakamoto, Sadao; and Uchihara, Yoshiharu, 4,957,776, Cl. 427-54.100.

Sanzo, Michael A.; Hardy, Medora M.; and Feder, Joseph, to Monsanto Company. Method of increasing yield of t-PA in cell culture. 4,957,863, Cl. 435-228.000.

Sari, Hikmet, to U.S. Philips Corporation. Circuit for recovering the carrier in digital transmission systems. 4,958,360, Cl. 375-97.000.

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Shim, Jae E., to Samsung Electronics Co., Ltd. Control circuit for a refrigerator combined with a microwave oven. 4,958,055, Cl. 219-10.55B.
Shima, Masayuki, to Ricoh Company, Ltd. Printing-plate preparation apparatus employed in screen printing machine including a non-adhesive platen surface and a manuscript reading unit. 4,957,378, Cl. 400-120.000.
Shima, Nobuhiko; Ida, Hisaaki; and Iyori, Yusuke, to Hitachi Metals, Ltd. Cermet alloy. 4,957,548, Cl. 75-238.000.
Shima, Yoshinobu; Ohmura, Masanori; Ohtani, Akira; and Araki, Kenji, to NKK Corporation. Apparatus for manufacturing single silicon crystal. 4,957,712, Cl. 422-249.000.
Shimada, Setsuo: *See*—
Yoshida, Shouki; and Shimada, Setsuo, 4,958,271, Cl. 364-200.000.
Shimada, Tomoyuki: *See*—
Aruga, Tamotsu; Sasaki, Masaomi; and Shimada, Tomoyuki, 4,957,838, Cl. 430-59.000.
Shimada, Yasunori: *See*—
Kawamura, Michio; Shimada, Yasunori; Inoshita, Koichi; Yoshida, Shozo; Kawanabe, Toshiaki; Hattori, Haruo; Doi, Yukio; and Awano, Mamoru, 4,957,666, Cl. 264-4.700.
Shimadzu Corporation: *See*—
Kobayashi, Junya; Oota, Masaaki; Kada, Katsuhiko; and Minakuchi, Hiroyoshi, 4,957,883, Cl. 501-35.000.
Shimanuki, Masanobu, to Kabushiki Kaisha Toshiba. Control system for a plurality of telephone sets. 4,958,370, Cl. 379-157.000.
Shimazu, Tomonori: *See*—
Inamori, Masahito; Horii, Tetsuo; Shimazu, Tomonori; and Sugaya, Masaji, 4,957,935, Cl. 514-383.000.
Shimeki, Hirokazu: *See*—
Ito, Yasuaki; Suzuki, Takehiko; and Shimeki, Hirokazu, 4,958,160, Cl. 355-53.000.
Shimizu Construction Co., Ltd.: *See*—
Tokuhiro, Tomoya; Miyauchi, Teruhiko; Kikuchi, Koshin; and Momoi, Teruhiko, 4,957,190, Cl. 187-32.000.
Shimizu, Goro: *See*—
Kamada, Masayasu; Maeda, Toshihisa; Kobayashi, Tadashi; and Shimizu, Goro, 4,957,949, Cl. 523-201.000.
Shimizu, Shigeo; and Takano, Hiroyuki, to Sankei Pharmaceutical Co., Ltd.; and Nippon Pharmaceutical Development Institute Company, Ltd. Intermediates for synthesis of cephalosporin compounds. 4,958,019, Cl. 540-226.000.
Shimoda, Tomoaki: *See*—
Agou, Tokinori; Sakashita, Takeshi; Shimoda, Tomoaki; Sudo, Masaru; Kuwabara, Masahiro; and Tanaka, Masahide, 4,957,985, Cl. 526-246.000.

Shimomura, Takeshi: *See*—
Ushizawa, Norihiko; and Shimomura, Takeshi, 4,957,615, Cl. 204-415.000.
Shimoyama, Noriyuki: *See*—
Iizuka, Shunichi; Sakamaki, Yoshiyuki; and Shimoyama, Noriyuki, 4,957,954, Cl. 524-102.000.
Shimura, Kaizo; Takeuchi, Hiroyasu; Hirano, Masahiro; and Imai, Yohji, to Mitsubishi Mining & Cement Co., Ltd. Artificial tooth. 4,957,437, Cl. 433-169.000.
Shin-Etsu Chemical: *See*—
Yoshioka, Hiroshi; Yamaya, Masaaki; Ohsaki, Hiromi; and Hayashida, Akira, 4,958,040, Cl. 556-467.000.
Shin Etsu Chemical Co., Ltd.: *See*—
Endo, Mikio; Takamizawa, Minoru; Ishihara, Toshinobu; Kubota, Tohru; and Shinohara, Toshio, 4,957,607, Cl. 204-157.740.
Shin, Kju H.: *See*—
Hale, Paul S.; and Shin, Kju H., 4,958,034, Cl. 549-255.000.
Shindo, Junko: *See*—
Saita, Taketsugu; and Shindo, Junko, 4,957,763, Cl. 426-548.000.
Shinjoh, Hirofumi: *See*—
Matsumoto, Shinichi; Tanaka, Toru; Ishikawa, Yutaka; Matsuura, Shinji; Shinjoh, Hirofumi; and Ozawa, Masakuni, 4,957,896, Cl. 502-304.000.
Shinoda, Koushi: *See*—
Ando, Manabu; Nakamura, Nobuo; Tsuchiya, Yoshitane; Fuse, Hirotaka; Watanabe, Kazuo; and Shinoda, Koushi, 4,956,944, Cl. 51-165.710.
Shinoda, Tsuyoshi: *See*—
Shiraishi, Hiroshi; Tajima, Nobuo; Shinoda, Tsuyoshi; and Hirotsu, Nobuyoshi, 4,958,057, Cl. 219-121.500.
Shinohara, Toshio: *See*—
Endo, Mikio; Takamizawa, Minoru; Ishihara, Toshinobu; Kubota, Tohru; and Shinohara, Toshio, 4,957,607, Cl. 204-157.740.
Shinomiya, Kohji, to Mitsubishi Denki Kabushiki Kaisha. Method for manufacturing semiconductor device. 4,957,882, Cl. 437-209.000.
Shintai, Akira: *See*—
Shibata, Hiroshi; Maehara, Fuyuki; Shintai, Akira; and Kato, Hidetoshi, 4,957,876, Cl. 437-209.000.
Shioji, Mitsuaki, to Sharp Kabushiki Kaisha. Stereo image display device. 4,957,351, Cl. 350-348.000.
Shiojima, Kenji; and Kasai, Yuji, to Kokusan Kinzoku Kogyo Kabushiki Kaisha. Coin-operated locker. 4,957,196, Cl. 194-239.000.
Shiraga, Mitsuaki: *See*—
Itagaki, Takaharu; Shiraga, Mitsuaki; Sawayama, Shigeru; and Satoh, Kohichi, 4,957,977, Cl. 525-328.400.
Shiraishi, Hiroshi; Tajima, Nobuo; Shinoda, Tsuyoshi; and Hirotsu, Nobuyoshi, to Nippon Steel Corporation. Transfer-type plasma torch with ring-shaped cathode and with processing gas passage provide interiorly of the cathode. 4,958,057, Cl. 219-121.500.
Shirodkar, Pradeep P., to Mobil Oil Corporation. Improved blends of linear low density ethylene copolymers. 4,957,969, Cl. 525-86.000.
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Shiroi, Takashi: *See*—
Torii, Sigeru; Tanaka, Hideo; Taniguchi, Masatoshi; Sasaoka, Michio; Saito, Norio; Shiroi, Takashi; Nagao, Shigemitsu; Kikuchi, Ryo; and Kameyama, Yutaka, 4,958,018, Cl. 540-215.000.
Shiroishi, Hirokazu: *See*—
Kobayashi, Kenzo; and Shiroishi, Hirokazu, 4,958,260, Cl. 361-398.000.
Shirokaze, Junichi, to Asahi Kasei Kogyo Kabushiki Kaisha. Multi-cellular cellulose particle and process for preparation thereof. 4,958,014, Cl. 536-56.000.
Shizuo, Yokohori; Kenzo, Miyamoto; Koji, Fukushima; Masami, Tsujimoto; Kenji, Onda; and Kan, Sato, to Toyo Tire & Rubber Co., Ltd. Self-molding hose and a continuous vulcanization method. 4,957,792, Cl. 428-36.200.
Shoda, Isao. Chip removing device for multi-head machine tool. 4,957,148, Cl. 144-252.00R.
Shoesmith, Roy, to Bay Mills Limited. Reinforcements for asphaltic paving, processes for making such reinforcements, and reinforced pavings. 4,957,390, Cl. 404-70.000.
Shoher, Itzhak; and Whiteman, Aharon E. Prefabricated dental pontic, pontic connector and assembly. 4,957,439, Cl. 433-180.000.
Short, William T.: *See*—
Mentzer, Charles C.; Cox, Howard W.; and Short, William T., 4,957,802, Cl. 428-174.000.
Shotts, David A.: *See*—
Basile, Raffaele; and Shotts, David A., 4,957,314, Cl. 285-355.000.
Showa Aluminum Corporation: *See*—
Mizoguchi, Masaaki; Inoue, Susumu; Otsuka, Tatsuo; and Isoyama, Eizo, 4,957,159, Cl. 165-133.000.
Showa High Polymer Co., Ltd.: *See*—
Kawamura, Michio; Shimada, Yasunori; Inoshita, Koichi; Yoshida, Shozo; Kawanabe, Toshiaki; Hattori, Haruo; Doi, Yukio; and Awano, Mamoru, 4,957,666, Cl. 264-4.700.
Shterev, Krassimir E.: *See*—
Dimitrov, Dimiter A.; Dakov, Mincho S.; Tonchev, Dancho T.; Kalafirov, Hristo A.; Botev, Todor S.; Shterev, Krassimir E.; Kojuharov, Vladimir S.; Dimitrov, Yordan I.; and Tzvetkov, Dimiter V., 4,957,529, Cl. 65-112.000.
Siamp Cedap S.A.: *See*—
Bailet, Jean-Claude, 4,956,880, Cl. 4-413.000.
Sieber, Alexander: *See*—
Macholdt, Hans-Tobias; Sieber, Alexander; Schui, Franz; and Deubel, Reinhold, 4,957,841, Cl. 430-110.000.
Siemens Aktiengesellschaft: *See*—
Gottwald, Winfried, 4,958,247, Cl. 360-90.000.
Hassler, Dietrich, 4,957,099, Cl. 128-24.00A.
Herzog, Ludwig; and Knapp, Volker, 4,957,100, Cl. 128-24.00A.
Rudolph, Matthias, 4,957,695, Cl. 376-364.000.
Schroeder, Harry, 4,958,137, Cl. 335-128.000.
von Basse, Paul-Werner; Dortu, Jean-Marc; Herlitzek, Andrea; Kohlert, Dieter; and Schaper, Ulrich, 4,958,319, Cl. 365-154.000.
Siemens Automotive L.P.: *See*—
Weissler, Harold E., II; Weber, Robert E.; and Wakeman, Russell J., 4,957,074, Cl. 123-90.110.
Siemens Gammasonics, Inc.: *See*—
Malmin, Ronald E.; and Guth, William R., 4,958,081, Cl. 250-505.100.
Siliconix incorporated: *See*—
Blanchard, Richard A.; and Cogan, Adrian I., 4,958,204, Cl. 357-22.000.
Silva, Carlos P. S. E.: *See*—
Maier, Alfred E.; Cabral, Antonio W. M.; and Silva, Carlos P. S. E., 4,958,136, Cl. 335-42.000.
Silverman, Jack. Permutation group games. 4,957,298, Cl. 273-240.000.
Silvestri, George J., Jr., to Westinghouse Electric Corp. Steam turbine flow direction control system. 4,957,410, Cl. 415-169.100.
Silvestri, Sergio: *See*—
Nencioni, Luciano; Pileri, Piero; Peppoloni, Samuele; and Silvestri, Sergio, 4,957,736, Cl. 424-88.000.
Silvestrini, Jesus A.; and Barbier, Jose E., to IMDEC S.A. Fruit disintegrating apparatus. 4,957,043, Cl. 99-472.000.
Simons, Antonius J. F.: *See*—
Fortuin, Johannes M. H.; Goebel, Johannes C.; and Simons, Antonius J. F., 4,957,627, Cl. 210-679.000.
Sims, Richard L.; Baker, Billy S.; Dotson, Randy G.; York, Robert J.; and Herrell, Joey A., to Appalachian Computer Services. System and method for rapidly conveying document images between distant locations. 4,958,235, Cl. 358-402.000.
Sinn, Robert S.: *See*—
Kamarei, Ahmad R.; Catsimpoolas, Nicholas; McCluer, Robert; Mise, Takashi; and Sinn, Robert S., 4,957,741, Cl. 424-551.000.
Sipin, Anatole J. Gas delivery means. 4,957,107, Cl. 128-204.210.
SIRAC S.r.l.: *See*—
Carobbi, Renato; and Innocenti, Franco, 4,957,564, Cl. 127-46.300.
Sisson, Penelope R.: *See*—
Byrne, Phillip O.; Sisson, Penelope R.; and Ingham, Harry R., 4,957,490, Cl. 604-197.000.
Sitter, Erhard: *See*—
Kramer, Manfred; and Sitter, Erhard, 4,957,084, Cl. 123-447.000.
Sitton, William W.: *See*—
Firth, Rowland V. D., III; Hunter, Quay C., Jr.; Kohlin, Ronald A.; and Sitton, William W., 4,958,195, Cl. 355-290.000.
Sjogren, John A.: *See*—
Jonsson, Ulf E.; Sandberg, John A.; and Sjogren, John A., 4,957,745, Cl. 424-461.000.
SK Kohki Co., Ltd.: *See*—
Nishino, Hiroshi, 4,957,723, Cl. 423-449.000.
Skalka, Anna M.: *See*—
Bizub, Diane; Fischberg-Bender, Ellyn; and Skalka, Anna M., 4,957,859, Cl. 435-7.000.
Skeel, James C.: *See*—
Doescher, Robert D.; and Skeel, James C., 4,957,324, Cl. 296-190.000.
Skibbe, Harry: *See*—
Scott-Jackson, Dennis; and Skibbe, Harry, 4,958,071, Cl. 250-229.000.
Skinner, Philip: *See*—
Cleverley, John A.; Marsh, John F.; Skinner, Philip; and Miasik, Gaynor M., 4,957,642, Cl. 252-42.700.
Slee, Earl H.: *See*—
Wood, Robert J.; Slee, Earl H.; Pasik, Gregory E.; and Pileski, Michael J., 4,957,346, Cl. 350-96.260.
Sliskovic, Drago R.: *See*—
Picard, Joseph A.; Roth, Bruce D.; and Sliskovic, Drago R., 4,957,971, Cl. 514-252.000.
Small, Thomas L.: *See*—
Gallaher, T. L.; and Small, Thomas L., 4,957,563, Cl. 127-38.000.
Smeltz, Kenneth C., to Du Pont de Nemours, E. I., and Company. Organotitanium compositions useful for cross-linking. 4,958,038, Cl. 556-55.000.
Smith, Bernard: *See*—
Branovich, Louis E.; Smith, Bernard; Freeman, Gerard L.; and Eckart, Donald W., 4,957,463, Cl. 445-50.000.
Smith, Bradley W., to Morton Thiokol, Inc. Solid propellant canister loaded multiple pulsed or staged rocket motor. 4,956,971, Cl. 60-245.000.
Smith, David R.: *See*—
Gerstle, Patrick J.; Mathis, Mac A.; Smith, David R.; and Stilz, Kathryn R., 4,957,380, Cl. 400-279.000.
Smith, Dewey W.: *See*—
Ries, Richard D.; Smith, Dewey W.; and Payton, Spero, 4,958,214, Cl. 357-74.000.
Smith, Emily M.: *See*—
Smith, Lawrence M.; and Smith, Emily M., 4,957,629, Cl. 210-443.000.
Smith, Kim R.: *See*—
Fong, Pak Y.; Smith, Kim R.; and Sauer, Joe D., 4,957,893, Cl. 502-174.000.

Smith, Lawrence M.; and Smith, Emily M. Obstetrical filter and trap. 4,957,629, Cl. 210-443.000.

Smith, Lee W.: *See*—
Zarate, Robert A.; Self, Richard E.; and Smith, Lee W., 4,957,523, Cl. 62-13.000.

Smith, Robert A.: *See*—
Schadow, Klaus C.; Gutmark, Ephraim; Wilson, Kenneth J.; and Smith, Robert A., 4,957,242, Cl. 239-590.000.

Smith, Sarah J.: *See*—
Caprathe, Bradley W.; Jaen, Juan C.; Smith, Sarah J.; and Wise, Lawrence D., 4,957,921, Cl. 514-252.000.

Smith, Tennyson, to Photoacoustic Technology, Inc. Apparatus and process for performing ellipsometric measurements of surfaces. 4,957,368, Cl. 356-369.000.

Smith, Ward C., to Becton Dickinson and Company. Method for separating the cellular components of blood samples. 4,957,638, Cl. 210-782.000.

Smithgall, David H., Sr.: *See*—
Frazee, Ralph E., Jr.; and Smithgall, David H., Sr., 4,957,526, Cl. 65-3.110.

Snelgrove, R. Vernon: *See*—
McCullough, Francis P., Jr.; Goswami, Bhuvenesh C.; Snelgrove, R. Vernon; and Hall, David M., 4,957,807, Cl. 428-222.000.

Snyder, Richard H., to Brunswick Corporation. Propeller shroud with load bearing structure. 4,957,459, Cl. 440-72.000.

Societe Anmyne Dite: *See*—
Thuries, Edmond, 4,956,903, Cl. 29-631.000.

S.A. des Etablissements Staubli (France): *See*—
Houlon, Louis, 4,957,142, Cl. 139-88.000.

Societe Atochem: *See*—
Commandeur, Raymond; and Gurtner, Bernard, 4,957,815, Cl. 428-402.200.
Glemet, Michel; and Cognet, Gilles, 4,957,422, Cl. 425-114.000.

Societe Electronique De La Region Pays De Loire: *See*—
Huerre, Dominique, 4,958,261, Cl. 361-417.000.

Societe Nationale d'Etude et de Construction de Moteurs d'Aviation S.N.E.C.M.A.: *See*—
Girault, Patrick L. E., 4,957,411, Cl. 415-173.400.

Soejima, Katsumoto, to NEC Corporation. Self-aligned Bi-CMOS device having high operation speed and high integration density. 4,957,874, Cl. 437-31.000.

Sogah, Dotsevi Y., to Du Pont de Nemours, E. I., and Company. Uncatalyzed process for preparing "living" polymers. 4,957,973, Cl. 525-280.000.

Solval, A. Robert; Cooperstein, Gerald; Goldstein, Shyke A.; and Hearn, David R., to Elscint Ltd. Medical imaging device using triggered plasma cathode flash X-ray source. 4,958,365, Cl. 378-122.000.

Solex: *See*—
Roger, Labouefle, 4,957,241, Cl. 239-409.000.

Solomon, Dennis, to Altman Stage Lighting Co., Inc. Symmetrical color changer system. 4,958,265, Cl. 362-293.000.

Soltech, Inc.: *See*—
Nelson, Thomas E., 4,956,909, Cl. 29-451.000.

Sonoco Products Company: *See*—
Rummage, Tony F.; Wise, John T.; Foehrenbach, Charles D.; and Cunningham, McCleery B., 4,957,270, Cl. 249-48.000.

Sony Corporation: *See*—
Ando, Naotaka; and Funado, Shigeto, 4,958,156, Cl. 341-123.000.
Inazawa, Yoshizumi; Milthorp, Brian; and Thompson, Bruce, 4,958,244, Cl. 360-72.100.
Toyoshima, Masakatsu, 4,958,381, Cl. 455-4.000.
Yasuda, Akio; and Ito, Kengo, 4,957,352, Cl. 350-353.000.

Sooter, Matthew C.: *See*—
Whitfill, Donald L.; Kubena, Edwin, Jr.; Cantu, Terry S.; and Sooter, Matthew C., 4,957,174, Cl. 175-72.000.

Sorensen, Robert C.; and Hendrickson, Thomas S., to RCS Industries, Inc. Lamp having an improved bulb mounting member. 4,958,266, Cl. 362-310.000.

Sotome, Kenichi; and Nagasaki, Munetaka, to SSMC Inc. Triple folding device for folding a towel hem. 4,957,052, Cl. 112-147.000.

Southwest Research Institute: *See*—
O'Brien, John T., 4,958,333, Cl. 367-154.000.

Speck, Kenneth R.: *See*—
Potember, Richard S.; Speck, Kenneth R.; and Hu, Henry S., 4,957,725, Cl. 423-592.000.

Spector, George: *See*—
Kastner, Hugh B.; and Spector, George, 4,957,288, Cl. 273-2.000.
Major, John J.; and Spector, George, 4,957,290, Cl. 273-56.000.

Spectra-Physics, Inc.: *See*—
Nohl, Andre; and White, Landy B., 4,957,009, Cl. 73-864.840.

Speedie, Robert, to Ronstan International Pty. Ltd. Cam cleat. 4,956,897, Cl. 24-134.00P.

Spencer, H. Kenneth: *See*—
Kudzma, Linas V.; Spencer, H. Kenneth; and Severnak, Sherry A., 4,957,929, Cl. 514-326.000.

Spencer, James T.; Dowben, Peter A.; and Kim, Yoon G., to Syracuse University. Deposition of boron-containing films from decaborane. 4,957,773, Cl. 427-39.000.

Spinner, Hermann, to W. Schlafhorst & Co. Textile winding machine. 4,957,245, Cl. 242-35.50A.

Sprague, Gailen. Hand wipe holder. 4,957,232, Cl. 224-253.000.

Springer, Willi: *See*—
Wagner, Wolf-Dietrich; Springer, Willi; Meissner, Ludwig; Bonfert, Helmut; Bottcher, Michael; Hardt, Thomas; Klumpp, Rolf; Krause, Klaus; Peters, Arndt; Plattner, Ernst; Strobel, Wolfgang; Waller, Wolfgang; and Wiemann, Gunter, 4,957,068, Cl. 123-41.82R.

Sprung, Philip D. Method and system for purification of water for greenhouse structures. 4,956,936, Cl. 47-17.000.

Square D Company: *See*—
Bartee, Edward C., 4,958,047, Cl. 174-48.000.

Srour, Nassy, to United States of America, Army. Method for low frequency attenuation in fluidic amplification of acoustic signals. 4,957,132, Cl. 137-14.000.

SSMC Inc: *See*—
Garron, Stephen A., 4,957,828, Cl. 429-92.000.

SSMC Inc.: *See*—
Sotome, Kenichi; and Nagasaki, Munetaka, 4,957,052, Cl. 112-147.000.

Stack, Gary P.: *See*—
Abou-Gharbia, Magid A.; Stack, Gary P.; and Lappe, Rodney W., 4,957,913, Cl. 514-216.000.

Stacy, Robert G.: *See*—
Pong, William; Stacy, Robert G.; and Bancroft, Allen J., 4,958,068, Cl. 250-222.100.

Staendeke, Horst; and Scharf, Daniel, to Hoechst Aktiengesellschaft. Flame-retardant polymer compositions. 4,957,950, Cl. 523-205.000.

Staffin, H. Kenneth: *See*—
Eng, Meng-Teck; and Staffin, H. Kenneth, 4,957,431, Cl. 432-31.000.

Stamicarbon B. V.: *See*—
Fortuin, Johannes M. H.; Goebel, Johannes C.; and Simons, Antonius J. F., 4,957,627, Cl. 210-679.000.

Standard Products Company, The: *See*—
Vaughan, Robert A., 4,956,941, Cl. 49-440.000.

Stanevich, Kenneth W.; and Regnier, Kent E., to Molex Incorporated. Low insertion force, low board stress electrical connector. 4,957,448, Cl. 439-326.000.

Stardent Computer, Inc.: *See*—
Worley, Wm. Spencer, III; Fenson, Eitan; and Weatherford, James R., 4,958,350, Cl. 371-37.400.

Staubli, Markus: *See*—
Lawrence, Peter; Nazmy, Mohamed; and Staubli, Markus, 4,957,703, Cl. 420-448.000.

STC PLC: *See*—
Kirkby, Paul A., 4,957,340, Cl. 350-96.160.
Ojha, Sureshchandra M.; Rosser, Paul J.; and Moynagh, Philip B., 4,957,873, Cl. 437-20.000.
Rokos, George H. S., 4,958,209, Cl. 357-34.000.

Stearns, Charles C.: *See*—
Ang, Peng-Huat; and Stearns, Charles C., 4,958,312, Cl. 364-754.000.

Steeg, Michael; Neuhaus, Peter; Roth, Albert; and Engel, Ulrich, to Glyco-Metall-Werke Daelen & Loos GmbH. Laminated material for friction bearing elements, comprising an antifriction layer of an aluminum based bearing material. 4,957,822, Cl. 428-653.000.

Steele, Scott B.: *See*—
Hemmady, Jayant G.; Lidinsky, William P.; Steele, Scott B.; Ulrich, Werner; and Weddige, Roanld C., 4,958,341, Cl. 370-60.100.

Stein, Brandy L.: *See*—
Lindley, Stephen M.; and Stein, Brandy L., 4,956,881, Cl. 4-517.000.

Steiner, Ulrich A.: *See*—
See, Benito; and Steiner, Ulrich A., 4,958,000, Cl. 528-271.000.

Steininger, Helmut, to BASF Aktiengesellschaft. Production of a thin x-ray amorphous aluminum nitride or aluminum silicon nitride film on a surface. 4,957,604, Cl. 204-192.160.

Steinman, Vivien Y.: *See*—
Lepore, Robert G.; Hansen, Hannelore G.; and Steinman, Vivien Y., 4,958,224, Cl. 358-126.000.

Stevenson, Andrew C.: *See*—
Scuccato, Serge L.; and Stevenson, Andrew C., 4,958,380, Cl. 388-806.000.

Stewart, Ray F.; and Thompson, James C., to Raychem Corporation. Electrodes for use in electrochemical processes. 4,957,612, Cl. 204-196.000.

Stiefel Laboratories, Inc.: *See*—
Stiefel, Werner K., 4,957,747, Cl. 424-691.000.

Stiefel, Werner K., to Stiefel Laboratories, Inc. Method of treating aged skin. 4,957,747, Cl. 424-691.000.

Stil, Jacob H.; Ooms, Adrianus J.; and Mink, Bernardus H., to Shell Oil Company. Process and apparatus for cooling and purifying a hot gas. 4,957,657, Cl. 252-373.000.

Stiles, Gardiner S.: *See*—
Bi, Qi; Stiles, Gardiner S.; and Huang, Chien M., 4,958,225, Cl. 358-133.000.

Stilz, Kathryn R.: *See*—
Gerstle, Patrick J.; Mathis, Mac A.; Smith, David R.; and Stilz, Kathryn R., 4,957,380, Cl. 400-279.000.

Stipek, Theodor: *See*—
Pischinger, Anton; and Stipek, Theodor, 4,957,418, Cl. 417-494.000.

Stolz, Edwin J.: *See*—
Hamilton, Michael N.; and Stolz, Edwin J., 4,957,177, Cl. 177-211.000.

Storry, Joel C. Recreational projectile. 4,957,300, Cl. 273-428.000.

Stritzl, Karl: *See*—
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Strobel, Wolfgang: *See*—
Wagner, Wolf-Dietrich; Springer, Willi; Meissner, Ludwig; Bonfert, Helmut; Bottcher, Michael; Hardt, Thomas; Klumpp, Rolf;

Krause, Klaus; Peters, Arndt; Plattner, Ernst; Strobel, Wolfgang; Waller, Wolfgang; and Wiemann, Gunter, 4,957,068, Cl. 123-41.82R.

Strohmeier, Warren O.: *See*—
Yard, John; and Strohmeier, Warren O., 4,957,005, Cl. 73-861.380.

Strohmeyer, Charles, Jr., to Electrodyne Research Corp. Organic waste fuel combustion system integrated with a gas turbine combined cycle. 4,957,049, Cl. 110-234.000.

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Kuijk, Karel E.; and Stroomer, Martinus V. C., 4,958,152, Cl. 340-784.000.

Stubblefield, Steven A., to Texaco Inc. Marine walkaway vertical seismic profiling. 4,958,328, Cl. 367-15.000.

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Bogdanovic, Borislav, 4,957,727, Cl. 423-647.000.

Sudo, Masaru: *See*—
Agou, Tokinori; Sakashita, Takeshi; Shimoda, Tomoaki; Sudo, Masaru; Kuwabara, Masahiro; and Tanaka, Masahide, 4,957,985, Cl. 526-246.000.

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Sudor Partners: *See*—
Schoendorfer, Donald W.; and Miller, William R., 4,957,108, Cl. 128-632.000.

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Munk, Werner G.; Klecker, Manfred; and Haas, Franz, 4,957,754, Cl. 426-138.000.

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Ando, Kenji; Kamiya, Osamu; Sugata, Masao; Kurihara, Noriko; Sugata, Hiroyuki; Den, Tohru; Kimura, Toshiaki; Hamamoto, Takashi; Haruta, Masahiro; and Osabe, Kuniji, 4,957,061, Cl. 118-719.000.

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Nakatani, Shigeki; Koshimoto, Naohide; and Sugimoto, Hiroyuki, 4,957,079, Cl. 123-90.340.

Sugimura, Toshiya; and Yoshimura, Hiroshi, to Isuzu Motors Limited. Electronic control system for automatic vehicle transmission. 4,958,287, Cl. 364-424.100.

Sugiura, Susumu; Sato, Tadashi; and Nakajima, Norio, to Canon Kabushiki Kaisha. Process apparatus for processing memory which stores information. 4,958,232, Cl. 358-300.000.

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Yamanaka, Toshihiro; Horie, Nobuyuki; Kobayashi, Shozou; Deguchi, Toshihisa; Yamaguchi, Takeshi; Maeda, Shigemi; Nishioka, Yoshiki; and Sugiura, Teruki, 4,958,337, Cl. 369-58.000.

Sugiyama, Akira: *See*—
Nakashima, Mitsuyoshi; Kanamaru, Mitsutaka; Sugiyama, Akira; Terakawa, Masato; Ono, Takaharu; and Horiai, Haruo, 4,957,923, Cl. 514-259.000.

Sugiyama, Yoshihiro: *See*—
Fukase, Toshiyuki; Sugiyama, Yoshihiro; Takanashi, Hazime; Tsubuko, Kazuo; and Kuramoto, Shinichi, 4,957,842, Cl. 430-114.000.

Sullivan, Mary: *See*—
Fitch, John J.; Parker, Tim; Bouchard, Alfred T., Jr.; and Sullivan, Mary, 4,958,173, Cl. 346-160.100.

Sum, Michael J.; Bennett, George W.; Merrell, Steven A.; and Walker, Neil, to General Electric Company. Aircraft propeller speed control. 4,958,289, Cl. 364-431.010.

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Minai, Masayoshi; Ueda, Yuji; Higashii, Takayuki; Kondo, Michitada;; and Kai, Seiichi, 4,957,867, Cl. 435-280.000.
Mizuno, Yukio; and Maruyama, Takashi, 4,957,967, Cl. 525-68.000.
Nishio, Taichi; Abe, Hiroomi; Suzuki, Yasurou; Sanada, Takashi; Hosoda, Satoru; and Okada, Takayuki, 4,957,966, Cl. 525-66.000.
Ohmse, Tadayuki; Sakurai, Tadashi; Yamaguchi, Noboru; Okada, Mitsuyuki; and Asao, Kouichiro, 4,957,660, Cl. 252-500.000.
Saito, Yasuhisa; Watanabe, Katsuya; Okuno, Kohichi; Kamio, Kunimasa; and Morii, Akira, 4,957,995, Cl. 528-99.000.
Takao, Hiroyoshi; Imai, Akio; Seki, Tomoski; and Tsuji, Mitsuji, 4,957,976, Cl. 525-340.000.
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Sumitomo Metal Industries, Ltd.: *See*—
Masuyama, Fujimitsu; Daikoku, Takashi; Haneda, Hisao; Yoshikama, Kunihiko; Teranishi, Hiroshi; and Iseda, Atsuro, 4,957,701, Cl. 420-69.000.

Sumitomo Rubber Industries, Ltd.: *See*—
Iuchi, Munenori, 4,957,149, Cl. 152-209.00R.
Takehara, Kenji, 4,957,151, Cl. 152-454.000.

Sumitomo Wiring Systems, Limited: *See*—
Horiuchi, Kazuya; Uchida, Kihachiro; Harada, Tadashi; and Izawa, Takeshi, 4,957,455, Cl. 439-548.000.

Summers, David J.: *See*—
Summers, Donald L.; and Summers, David J., 4,957,271, Cl. 249-82.000.

Summers, Donald L.; and Summers, David J. Container for meat molding. 4,957,271, Cl. 249-82.000.

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Sekiguchi, Takeshi, 4,958,200, Cl. 357-5.000.

Sun Microsystems, Inc.: *See*—
Bell, Alan E., 4,958,378, Cl. 382-34.000.
Priem, Curtis; Malachowsky, Chris; and Webber, Thomas, 4,958,146, Cl. 340-703.000.

Sun, Xiaowei: *See*—
Greiner, Alain; Sun, Xiaowei; and Thill, Michel, 4,958,353, Cl. 371-49.400.

Suni, Paul P.; and Wen, David D., to Loral Fairchild Corporation. Floating diode gain compression. 4,958,207, Cl. 357-24.000.

Sunrail Co., Ltd.: *See*—
Hirose, Norio, 4,956,950, Cl. 52-94.000.

Sunstar Kabushiki Kaisha: *See*—
Yoshiki, Kanetsugu; and Urayama, Takanaga, 4,957,202, Cl. 206-44.110.

Surgical Systems & Instruments, Inc.: *See*—
Shiber, Samuel, 4,957,482, Cl. 604-22.000.

Sutton, David: *See*—
Cole, Martin; Boyd, Malcolm R.; and Sutton, David, 4,957,733, Cl. 424-85.400.

Sutton, Peter M.; Atkinson, Anthony; and Lloyd, Graham, to Public Health Laboratory Service Board. Method and composition for the treatment and prevention of viral infections. 4,957,910, Cl. 514-182.000.

Suutarinen, Oiva. Floatation clarifying and flocculating/purification of liquid. 4,957,633, Cl. 210-705.000.

Suwabe, Moriaki: *See*—
Kobayashi, Hidenori; Suwabe, Moriaki; Inakazu, Nobuhiro; and Nagamatsu, Hatsuo, 4,957,682, Cl. 264-255.000.

Suzuki, Hidetoshi; Yamamoto, Mitsuru; Majima, Toshiaki; and Nomura, Ichiro, to Canon Kabushiki Kaisha. Display device having first and second cold cathodes. 4,958,104, Cl. 313-495.000.

Suzuki, Hiromitsu: *See*—
Matsumura, Hideo; Nishino, Hirohito; Fukuyama, Hidetoshi; Yamazaki, Kazutoshi; and Suzuki, Hiromitsu, 4,957,614, Cl. 204-411.000.

Suzuki, Hiroshi: *See*—
Kikuchi, Tohru; Fujita, Toshiyuki; Saito, Takayuki; Kojima, Mitsumasa; Sato, Hidetaka; and Suzuki, Hiroshi, 4,958,001, Cl. 528-346.000.

Suzuki, Isao, to Kawai Musical Instruments Mfg. Co., Ltd. Electronic musical instrument having a vibrato effecting capability. 4,957,030, Cl. 84-604.000.

Suzuki, Katsuhisa: *See*—
Yoshida, Masashi; Suzuki, Katsuhisa; and Yoshikawa, Masaaki, 4,957,942, Cl. 521-62.000.

Suzuki, Kenichirou: *See*—
Nagai, Teizi; Tokushima, Yasuo; Kubota, Sadao; Suzuki, Kenichirou; Fujitani, Yoshiyasu; Yoshimoto, Taisuke; Muraki, Hideaki; and Tachi, Hideo, 4,957,710, Cl. 422-171.000.

Suzuki, Kuninori: *See*—
Fujii, Masaki; Tamura, Hitoshi; Suzuki, Kuninori; and Hatakeyama, Noboru, 4,958,196, Cl. 355-298.000.

Suzuki, Kunio: *See*—
Miyano, Tetsuji; Suzuki, Kunio; Ushijima, Ryosuke; and Nakagawa, Susumu, 4,958,024, Cl. 546-249.000.

Suzuki, Masao. Method for purifying fatty acids. 4,957,662, Cl. 260-419.000.

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Yamazaki, Kazumasa; Mizuyama, Yaichiro; Horita, Takashi; and Suzuki, Shinichi, 4,957,594, Cl. 204-27.000.

Suzuki, Susumu: *See*—
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Suzuki, Syuzi: *See*—
Saitoh, Shiroh; Izumi, Mamoru; Suzuki, Syuzi; and Abe, Kazuhide, 4,958,327, Cl. 367-7.000.

Suzuki, Takehiko: *See*—
Ito, Yasuaki; Suzuki, Takehiko; and Shimeki, Hirokazu, 4,958,160, Cl. 355-53.000.

Suzuki, Tetuo: *See*—
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Suzuki, Tomio: *See*—
Hikosaka, Akihide; Mimura, Tsuyoshi; Suzuki, Tomio; Yoshigae, Takeo; and Itoh, Shuzo, 4,957,545, Cl. 75-501.000.

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Suzuki, Yasurou: *See*—
Nishio, Taichi; Abe, Hiroomi; Suzuki, Yasurou; Sanada, Takashi; Hosoda, Satoru; and Okada, Takayuki, 4,957,966, Cl. 525-66.000.

Suzzi, Antonio V.: *See*—
Maldina, Paolo; Piana, Maurizio; and Suzzi, Antonio V., 4,957,122, Cl. 131-281.000.

Sverdlin, Anatoly. Fuel injection system for internal combustion engines. 4,957,085, Cl. 123-467.000.

Swartzel, Kenneth R.; Ball, Hershell R., Jr.; and Hamid-Samimi, Mohammad-Hossein, to North Carolina State University. Method for the ultrapasteurization of liquid whole egg products. 4,957,759, Cl. 426-399.000.

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Knight, Peter E.; and Lyons, John E., 4,957,152, Cl. 160-345.000.

Swisher, George W., Jr., to CMI Corporation. Drum baffle. 4,957,433, Cl. 432-103.000.

Sydansk, Robert D., to Marath Oil Company. Lost circulation treatment for oil field drilling operations. 4,957,166, Cl. 166-295.000.

Syntex (U.S.A.) Inc.: *See*—
Clark, Robin D.; Berger, Jacob; and Weinhardt, Klaus K., 4,957,914, Cl. 514-217.000.

Syracuse University: *See*—
Spencer, James T.; Dowbes, Peter A.; and Kim, Yoon G., 4,957,773, Cl. 427-39.000.

Szuba, Stefan P.: *See*—
Mattas, Charles B.; Van Zanten, Egbert; and Szuba, Stefan P., 4,958,107, Cl. 315-289.000.

Szykowski, John P.: *See*—
Rossi, Albert; Szykowski, John P.; and Tack, Robert D., 4,957,650, Cl. 252-51.50A.

T J International, Inc.: *See*—
Reetz, William R., 4,957,186, Cl. 248-296.000.

Ta, Cuong Manh, to American Standard Inc. Multiple contact electrical connector portion for an automatic railway coupler. 4,957,208, Cl. 213-1.300.

Tabaru, Tsugio: *See*—
Kosugi, Ryuichi; and Tabaru, Tsugio, 4,958,322, Cl. 365-189.010.

Tachi, Hideo: *See*—
Nagai, Teizi; Tokushima, Yasuo; Kubota, Sadao; Suzuki, Kenichirou; Fujitani, Yoshiyasu; Yoshimoto, Taisuke; Muraki, Hideaki; and Tachi, Hideo, 4,957,710, Cl. 422-171.000.

Tachikawa, Kyoji: *See*—
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Tack, Robert D.: *See*—
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Taft, Phillip A.: *See*—
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Taga, Toshiyuki; and Kasahara, Senshi, to Tosoh Corporation. Process for preparation of synthetic mazzite. 4,957,719, Cl. 423-328.000.

Taio Paper Manufacturing Co., Ltd.: *See*—
Kawamura, Michio; Shimada, Yasunori; Inoshita, Koichi; Yoshida, Shozo; Kawanabe, Toshiaki; Hattori, Haruo; Doi, Yukio; and Awano, Mamoru, 4,957,666, Cl. 264-4.700.

Tajima, Nobuo: *See*—
Shiraishi, Hiroshi; Tajima, Nobuo; Shinoda, Tsuyoshi; and Hirotsu, Nobuyoshi, 4,958,057, Cl. 219-121.500.

Tajima, Tetsuo: *See*—
Sudo, Ryoichi; Kobata, Makoto; Miwa, Hiroaki; and Tajima, Tetsuo, 4,957,990, Cl. 526-282.000.

Takahashi, Hiroshi, to Nissan Motor Company, Limited. System and method for automatically controlling a vehicle speed to a desired cruising speed. 4,958,288, Cl. 364-426.040.

Takahashi, Hiroshi: *See*—
Kikkawa, Kazumi; and Takahashi, Hiroshi, 4,957,953, Cl. 524-99.000.

Takahashi, Koji: *See*—
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Takahashi, Kousuke, to NEC Corporation. Character string identification device with a memory comprising selectively accessible memory areas. 4,958,377, Cl. 382-34.000.

Takahashi, Osamu; Koyama, Koichi; and Koya, Keizo, to Fuji Photo Film Co., Ltd. Heat developable color light-sensitive material with dye developers. 4,957,848, Cl. 430-203.000.

Takahashi, Seishi, to Mitsui Toatsu Chemicals, Incorporated. Novel plasminogen activator and its preparation process. 4,957,864, Cl. 435-226.000.

Takahashi, Shogo: *See*—
Omura, Etsuji; Goto, Katsuhiko; Takahashi, Shogo; Namba, Harumi; and Takemoto, Akira, 4,957,879, Cl. 437-129.000.

Takahashi, Takao; Kato, Takatsugu; and Terushima, Shigero, to Nissan Motor Co., Ltd. Reed operating system for loom. 4,957,143, Cl. 139-190.000.

Takahashi, Takeshi; and Yamamoto, Takashi, to Toyota Jidosha Kabushiki Kaisha. Piezoelectric actuator. 4,958,101, Cl. 310-328.000.

Takahashi, Tsutomu, to Canon Kabushiki Kaisha. Electronic apparatus having a printing function. 4,957,377, Cl. 400-50.000.

Takakura, Hiroshi; Iida, Tetsuya; and Goto, Junkei, to Kabushiki Kaisha Toshiba. Semiconductor intergrated circuit device. 4,958,222, Cl. 357-84.000.

Takamizawa, Minoru: *See*—
Endo, Mikio; Takamizawa, Minoru; Ishihara, Toshinobu; Kubota, Tohru; and Shinohara, Toshio, 4,957,607, Cl. 204-157.740.

Takamura, Masashi: *See*—
Yoshida, Toshio; Hirai, Masayoshi; Nishizawa, Tetuo; and Takamura, Masashi, 4,958,178, Cl. 354-195.120.

Takanashi, Hazime: *See*—
Fukase, Toshiyuki; Sugiyama, Yoshihiro; Takanashi, Hazime; Tsubuko, Kazuo; and Kuramoto, Shinichi, 4,957,842, Cl. 430-114.000.

Takano, Hiroyuki: *See*—
Shimizu, Shigeo; and Takano, Hiroyuki, 4,958,019, Cl. 540-226.000.

Takao, Hiroyoshi; Imai, Akio; Seki, Tomoski; and Tsuji, Mitsuji, to Sumitomo Chemical Company Limited. Process for preparing diene polymer rubbers. 4,957,976, Cl. 525-340.000.

Takarabe, Yuji: *See*—
Izumi, Shuji; Nakai, Masaaki; Inoue, Manabu; Fujino, Akihiko; Kawamura, Kunio; Takarabe, Yuji; and Niwa, Masataka, 4,958,184, Cl. 354-474.000.

Takase, Haruo. Surgical needle for plastic surgery or the like. 4,957,502, Cl. 606-223.000.

Takase, Isao: *See*—
Kano, Takenori; Takemoto, Haruki; Niimi, Mamoru; Takase, Isao; and Yokoyama, Fumitomo, 4,957,195, Cl. 192-106.00F.

Takasu, Yoshio: *See*—
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Takatori Corporation: *See*—
Maegawa, Hiroji; and Omuta, Tatsuro, 4,957,051, Cl. 112-121.120.

Takayama, Akira, to Yamaha Hatsudoki Kabushiki Kaisha. Vehicle control system. 4,957,082, Cl. 123-334.000.

Takeda Chemical Industries, Ltd.: *See*—
Fujinawa, Shohei; Sakamoto, Yoshinori; and Iizuka, Harumasa, 4,958,017, Cl. 536-124.000.

Takeda, Kazuo; and Ito, Yoshitoshi, to Hitachi, Ltd. Apparatus for measuring characteristics of particles in fluid by detecting light scattered at the particles. 4,957,363, Cl. 356-73.000.

Takeda, Mamoru; Yamashita, Ichiro; and Kitahiro, Isamu, to Matsushita Electric Industrial Co., Ltd. Thin film transistor array and method of manufacturing the same. 4,958,205, Cl. 357-23.700.

Takeda, Takayuki; Masaki, Hiroshi; and Nose, Isamu, to Oki Electric Industry Co., Ltd. Optical head assembly with a minimum of inertia and feasible for high high-speed access. 4,958,335, Cl. 369-44.140.

Takeda, Yuji: *See*—
Obayashi, Atsushi; Takeda, Yuji; and Kinoshita, Kazuya, 4,957,818, Cl. 428-451.000.

Takehara, Kenji, to Sumitomo Rubber Industries, Ltd. Radial tire for passenger cars including folded band layer at the belt edges. 4,957,151, Cl. 152-454.000.

Takei, Tetsuya: *See*—
Saitoh, Keishi; Hashizume, Junichiro; Iida, Shigehira; Takei, Tetsuya; and Arai, Takayoshi, 4,957,772, Cl. 427-39.000.

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Kano, Takenori; Takemoto, Haruki; Niimi, Mamoru; Takase, Isao; and Yokoyama, Fumitomo, 4,957,195, Cl. 192-106.00F.

Takemura, Tooji; and Okubo, Takashi, to Nissan Motor Co., Ltd. Rotational speed differential responsive type torque transmitting assembly. 4,957,473, Cl. 475-231.000.

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Shimura, Kaizo; Takeuchi, Hiroyasu; Hirano, Masahiro; and Imai, Yohji, 4,957,437, Cl. 433-169.000.

Takikawa, Masahiko, to Fujitsu Limited. High electron mobility transistor. 4,958,203, Cl. 357-22.000.

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Kozuki, Suzumu; Takimoto, Hiroyuki; Kashida, Motokazu; Takahashi, Koji; and Nagasawa, Kenichi, 4,958,246, Cl. 360-77.150.

Takisawa, Yukihisa; Kono, Nobuharu; Saito, Kenji; and Yamachika, Hiroshi, to Sumitomo Chemical Company, Limited. Process for preparing alcohols. 4,958,033, Cl. 549-59.000.

Takizawa, Shozo, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Rear suspension apparatus for motor vehicles. 4,957,308, Cl. 280-666.000.

Talvan, Theodore: *See*—
Turnidge, Howard M.; and Talvan, Theodore, 4,957,296, Cl. 273-201.000.

Tam, Simon M.; and Lai, Stefan K. C., to Intel Corporation. Process for simultaneously fabricating EEPROM cell and flash EPROM cell. 4,957,877, Cl. 437-43.000.

Tamamori, Hideo, to Nippon Air Brake Company. Actuating cylinder having mechanical advantage. 4,957,193, Cl. 188-153.00R.

Tamari, Nobuyuki; Kondoh, Isao; and Kinoshita, Nakoto, to Agency of Industrial Science and Technology. Ceramic implant materials. 4,957,509, Cl. 623-16.000.

Tamura, Hitoshi: *See*—
Fujii, Masaki; Tamura, Hitoshi; Suzuki, Kuninori; and Hatakeyama, Noboru, 4,958,196, Cl. 355-298.000.

Tamura, Kohji; Kashiwagi, Hiroshi; and Noguchi, Masahiro, to Daikin Industries, Ltd. Refrigerants. 4,957,652, Cl. 252-67.000.

Tamura, Masashi: *See*—
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Tan, Kenichi; and Mizuno, Shoji, to Ikeda Bussan Co., Ltd. Lumbar support device. 4,957,102, Cl. 128-68.000.

Tan, Khen-Sang: *See*—
Gopinathan, Venugopal; and Tan, Khen-Sang, 4,958,120, Cl. 328-155.000.

Tanabe, Yoshimitsu: *See*—
Urakami, Tatsuhiro; Tanabe, Yoshimitsu; Yamaguchi, Keizaburo; and Yamaguchi, Akihiro, 4,957,994, Cl. 528-90.000.

Tanahashi, Toshio: *See*—
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Tanai, Sumio: *See*—
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Tanaka, Hideo: *See*—
Torii, Sigeru; Tanaka, Hideo; Taniguchi, Masatoshi; Sasaoka, Michio; Saito, Norio; Shiroi, Takashi; Nagao, Shigemitsu; Kikuchi, Ryo; and Kameyama, Yutaka, 4,958,018, Cl. 340-215.000.

Tanaka, Hitoshi: *See*—
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Tanaka, Jun; Oikawa, Hitoshi; Kunitomo, Yoshinobu; and Terasawa, Masami, to Kyocera Corporation. Package for housing semiconductor elements. 4,958,216, Cl. 357-73.000.

Tanaka, Katsumi: *See*—
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Tanaka, Kenjiro. Lifting device. 4,957,189, Cl. 187-12.000.

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Yamashita, Hideaki; Hayamizu, Tadashi; and Tanaka, Kiichiro, 4,958,199, Cl. 355-317.000.

Tanaka, Kunio; Onishi, Yasushi; and Itsubo, Yoshihiro, to Fanuc Ltd. Digitizing method. 4,958,293, Cl. 364-474.030.

Tanaka, Masahide: *See*—
Agou, Tokinori; Sakashita, Takeshi; Shimoda, Tomoaki; Sudo, Masaru; Kuwabara, Masahiro; and Tanaka, Masahide, 4,957,985, Cl. 526-246.000.

Tanaka, Shigeru, to Kabushiki Kaisha Toshiba. Integrated circuit device having row structure with clock driver at end of each row. 4,958,092, Cl. 307-480.000.

Tanaka, Shin-Ichi, to NEC Corporation. Bipolar transistor with abrupt potential discontinuity in collector region. 4,958,208, Cl. 357-34.000.

Tanaka, Sigenori: *See*—
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Tanaka, Toru: *See*—
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Tanaka, Yutaka: *See*—
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Torii, Sigeru; Tanaka, Hideo; Taniguchi, Masatoshi; Sasaoka, Michio; Saito, Norio; Shiroi, Takashi; Nagao, Shigemitsu; Kikuchi, Ryo; and Kameyama, Yutaka, 4,958,018, Cl. 340-215.000.

Taniguchi, Nobuyuki: *See*—
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Najjar, Mitri S., 4,957,544, Cl. 75-500.000.
Stubblefield, Steven A., 4,958,328, Cl. 367-15.000.
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Douglas, Monte A., 4,957,590, Cl. 156-643.000.
Eklund, Robert H.; and Havemann, Robert H., 4,958,213, Cl. 357-59.000.
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TMC Corporation: *See*—
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Tsuboi, Toshio; Moriya, Shigeru; and Nakatani, Keiji, to Minolta Camera Kabushiki Kaisha. Digital color copying machine comprising a test mode for making a color adjustment. 4,958,221, Cl. 358-80.000.
Tsubuko, Kazuo: *See*—
Fukase, Toshiyuki; Sugiyama, Yoshihiro; Takanashi, Hazime; Tsubuko, Kazuo; and Kuramoto, Shinichi, 4,957,842, Cl. 430-114.000.
Tsuchida, Shinji, to Canon Kabushiki Kaisha. Key telephone system accommodating both digital and analog telephone networks. 4,958,369, Cl. 379-156.000.
Tsuchiya, Hiroaki; and Nakahata, Kimio, to Canon Kabushiki Kaisha. Image forming apparatus for scanning both sides of an original and producing a duplex copy. 4,958,187, Cl. 355-202.000.
Tsuchiya, Yoshitane: *See*—
Ando, Manabu; Nakamura, Nobuo; Tsuchiya, Yoshitane; Fuse, Hirotaka; Watanabe, Kazuo; and Shinoda, Koushi, 4,956,944, Cl. 51-165.710.
Tsuchiya, Yutaka, to Hamamatsu Photonics Kabushiki Kaisha. Electro-optical streak camera. 4,958,231, Cl. 358-211.000.
Tsuchiya, Yutaka: *See*—
Koishi, Musubu; Aoshima, Shinichiro; and Tsuchiya, Yutaka, 4,958,124, Cl. 324-96.000.
Urakami, Tsuneyuki; Aoshima, Shinichiro; and Tsuchiya, Yutaka, 4,958,354, Cl. 372-29.000.
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Takao, Hiroyoshi; Imai, Akio; Seki, Tomoaki; and Tsuji, Mitsuji, 4,957,976, Cl. 525-340.000.
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Kinashi, Hiroshi; Kawabata, Itaru; Yamane, Hidenobu; Tsujimoto, Yoshiharu; Gotoh, Shinya; and Nawa, Masayoshi, 4,958,197, Cl. 355-299.000.
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Tsukada, Shigeru: *See*—
Yamada, Kunio; Tsukada, Shigeru; and Seki, Masao, 4,958,239, Cl. 358-457.000.
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Kawahara, Haruyuki; Tsukamoto, Seiichi; Nomura, Yutaka; Tanaka, Katsumi; Ashiura, Yasuyuki; and Yoshimura, Motonobu, 4,957,819, Cl. 428-547.000.
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Katoh, Naoyuki; Aoki, Masahiro; and Tsukamoto, Takeo, 4,957,677, Cl. 264-135.000.
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Itoh, Kiichi; Shibano, Takeshi; Yada, Shuhei; and Tsunoi, Shinji, 4,957,984, Cl. 526-240.000.
Tsutsui, Takashi, to Koyo Seiko Co., Ltd. Hub unit. 4,957,328, Cl. 301-105.00R.
Tsysin, Mark I.: *See*—
Denisov, Vladimir F.; Gertseva, Marina I.; Ziberov, Valentin E.; Karapetian, Vadim K.; Sarkisian, Norik S.; Karbachinsky, Vladimir M.; Kharlamov, Oleg I.; Tsoi, Alexei D.; Tsysin, Mark I.; Romanov, Alexei A.; Veranian, Vagan D.; Khripin, Vasily D.; and Shafran, Larisa E., 4,957,512, Cl. 55-8.000.
Tubbesing, Robert A.; and Carter, Bruce D., to Greenstreak Plastics Products Co. Roof ridge ventilator. 4,957,037, Cl. 98-42.210.
Tufts, Timothy A. Method for making a storage stable blend of a long chain polyol and a short chain diol by incorporating a bisphenol therein and the resulting blend. 4,957,654, Cl. 252-182.250.
Turek, Douglas E., to Du Pont Canada Inc. Method of predicting yarn caterpillar length. 4,956,902, Cl. 28-257.000.
Turkal, Randy J., to NRC Corporation. Apparatus and method for changing frequencies. 4,958,309, Cl. 364-580.000.
Turner, William F.; and Dews, James K. Water distillation apparatus. 4,957,200, Cl. 202-181.000.
Turnidge, Howard M.; and Talvan, Theodore, to Howco Trust. Golf ball dispenser and teeing device. 4,957,296, Cl. 273-201.000.
Twilton, Barry: *See*—
Woodward, Malcolm C.; and Twilton, Barry, 4,958,097, Cl. 310-83.000.
Tyms, A. Stanley: *See*—
Jacob, Gary S.; Tyms, A. Stanley; Rademacher, Thomas W.; and Dwek, Raymond A., 4,957,926, Cl. 514-315.000.
Tzvetkov, Dimiter V.: *See*—
Dimitrov, Dimiter A.; Dakov, Mincho S.; Tonchev, Dancho T.; Kalafirov, Hristo A.; Botev, Todor S.; Shterev, Krassimir E.; Kojuharov, Vladimir S.; Dimitrov, Yordan I.; and Tzvetkov, Dimiter V., 4,957,529, Cl. 65-112.000.

Ube Industries, Ltd.: *See*—
Imatani, Katsuo; Yamamoto, Shinichirou; and Koga, Genji, 4,958,002, Cl. 528-353.000.
Kaneko, Noriaki; Hirata, Yoshimi; and Moriwaki, Masahiro, 4,957,508, Cl. 623-12.000.
UCB Societe Anonyme: *See*—
Koshiba, Mitsunobu; Harita, Yoshiyuki; Furuto, Yuuji; Roland, Bruno; and Lombaerts, Ria, 4,957,588, Cl. 156-628.000.
Uchida, Hiroyasu; Ueda, Kazuhiko; and Oda, Hiroyuki, to Mazda Motor Corporation. Starter-alternator for a vehicle engine. 4,958,095, Cl. 310-59.000.
Uchida, Kensuke: *See*—
Chiba, Koji; and Uchida, Kensuke, 4,957,326, Cl. 296-210.000.
Uchida, Kihachiro: *See*—
Horiuchi, Kazuya; Uchida, Kihachiro; Harada, Tadashi; and Izawa, Takeshi, 4,957,455, Cl. 439-548.000.
Uchihara, Yoshiharu: *See*—
Higuchi, Masahiro; Sakamoto, Sadao; and Uchihara, Yoshiharu, 4,957,776, Cl. 427-54.100.
Uchikawa, Akira, to Japan Electronic Control Systems Co., Ltd. Oxygen gas concentration-detecting apparatus. 4,957,705, Cl. 422-94.000.
Uddo-Mims International, Inc.: *See*—
Mims, Ken, 4,957,622, Cl. 210-170.000.
Ueda, Hiroshi; and Ueda, Tomonao. Temporary solidifier for playing with sand. 4,957,558, Cl. 106-137.000.
Ueda, Hiroshi: *See*—
Matsui, Toru; and Ueda, Hiroshi, 4,958,180, Cl. 354-403.000.
Ueda, Kazuhiko: *See*—
Uchida, Hiroyasu; Ueda, Kazuhiko; and Oda, Hiroyuki, 4,958,095, Cl. 310-59.000.
Ueda, Tomoaki, to Daikin Industries, Ltd. Polygon filling control apparatus. 4,958,300, Cl. 364-521.000.
Ueda, Tomonao: *See*—
Ueda, Hiroshi; and Ueda, Tomonao, 4,957,558, Cl. 106-137.000.
Ueda, Yuji: *See*—
Minai, Masayoshi; Ueda, Yuji; Higashii, Takayuki; Kondo, Michitada;; and Kai, Seiichi, 4,957,867, Cl. 435-280.000.
Uesugi, Tsuneya: *See*—
Fujii, Sigezo; Uesugi, Tsuneya; and Sakamoto, Kiyoshi, 4,957,530, Cl. 65-172.000.
Uetake, Yoshinari: *See*—
Kojima, Shinjiro; Matsuda, Hideo; Iwasaki, Masami; and Uetake, Yoshinari, 4,958,215, Cl. 357-79.000.
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Wiegand, Karl W.; Thiemann, Michael; and Scheibler, Erich, 4,957,720, Cl. 423-392.000.
Uhlenhoff, Arnold, to Deutsche ITT Industries GmbH. CMOS parallel-serial multiplication circuit and multiplying and adding stages thereof. 4,958,313, Cl. 364-757.000.
Uhrich, Richard W.: *See*—
Reich, Ronald S.; and Uhrich, Richard W., 4,957,413, Cl. 416-115.000.
Ukita, Keizoo; Hamaguchi, Tetsuo; and Inoue, Masaaki, to Nippon Zeon Co., Ltd. Process for producing coke. 4,957,596, Cl. 201-20.000.
Ullrich, Peter: *See*—
Bockstiegel, Jurgen; Brindopke, Dieter; and Ullrich, Peter, 4,957,632, Cl. 210-248.000.
Ulrich, Nathan T., to University of Pennsylvania, Trustees of the. Methods and apparatus for mechanically intelligent grasping. 4,957,320, Cl. 294-106.000.
Ulrich, Werner: *See*—
Hemmady, Jayant G.; Lidinsky, William P.; Steele, Scott B.; Ulrich, Werner; and Weddige, Roanld C., 4,958,341, Cl. 370-60.100.
Umatate, Toshikazu: *See*—
Makinoochi, Susumu; and Umatate, Toshikazu, 4,958,082, Cl. 250-548.000.
Umeda, Yoshihito: *See*—
Komatsuzaki, Hiroshi; Kamata, Kazuo; Ohmiya, Akio; Nishimura, Syunji; Umeda, Yoshihito; Mochizuki, Noriya; and Furuya, Eiji, 4,958,179, Cl. 354-195.120.
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Watanabe, Tetsuji; Umezawa, Hidetsugu; and Tanaka, Sigenori, 4,957,144, Cl. 139-434.000.
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Kinnan, Frank R., 4,957,173, Cl. 175-61.000.
Underhill, Kenneth R., to Ford New Holland, Inc. Round baler with mechanism for dispensing wrapping material. 4,956,968, Cl. 56-341.000.
Undin, Hans, to C. A. Weidmuller GmbH & Co. Manual tool drivable by a rotary motor. 4,956,992, Cl. 72-451.000.
Unilever Patent Holdings B.V.: *See*—
Dutilh, Christian E., 4,957,768, Cl. 426-604.000.
Union Carbide Chemicals and Plastics Company Inc.: *See*—
Schiffauer, Reinhart; and Buchmuller, Walter, 4,957,944, Cl. 521-115.000.
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Bernier, Robert J.; Buhler-Vidal, Jorge O.; Haapala, Urho S.; and Rozenblat, Benjamin R., 4,958,006, Cl. 528-501.000.
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Ho, Min-Da, 4,957,050, Cl. 110-346.000.
Pahade, Ravindra F.; Ziemer, John H.; and Howell, John K., 4,957,524, Cl. 62-18.000.
Unisys Corp. (Formerly Burroughs Corp.): *See*—
Flora, Laurence P.; and Ruby, Gary V., 4,958,351, Cl. 371-40.100.
United Pharmaceuticals, Inc.: *See*—
Davis, William M., 4,957,941, Cl. 514-648.000.
U.S. Bioscience: *See*—
Gatenby, Robert A., 4,957,481, Cl. 604-20.000.
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Air Force: *See*—
Enloe, Carl L., 4,957,771, Cl. 427-38.000.
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Binder, Michael; and Mammone, Robert J., 4,957,602, Cl. 204-192.310.
Branovich, Louis E.; Smith, Bernard; Freeman, Gerard L.; and Eckart, Donald W., 4,957,463, Cl. 445-50.000.
Srour, Nassy, 4,957,132, Cl. 137-14.000.
Tasdemiroglu, Server, 4,957,034, Cl. 89-36.020.
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Barns, Chris E.; and Gunter, William D., 4,957,357, Cl. 350-576.000.
Cuddihy, Edward F.; and Willis, Paul B., 4,957,012, Cl. 73-866.000.
Gwin, Hal S.; and Aaron, James R., 4,957,139, Cl. 137-556.000.
Hung, Ching-Cheh, 4,957,661, Cl. 252-510.000.
Morris, Brian G., 4,956,996, Cl. 73-149.000.
Navy: *See*—
Balch, Kris S., 4,958,315, Cl. 364-900.000.
Cherry, Christopher R., 4,957,027, Cl. 89-1.140.
Higgins, Francis J., 4,958,330, Cl. 367-88.000.
Hofler, Thomas; Brininstool, Michael R.; Newmaster, Jeffrey T.; and Garrett, Steven L., 4,958,072, Cl. 250-231.130.
Reich, Ronald S.; and Uhrich, Richard W., 4,957,413, Cl. 416-115.000.
Schadow, Klaus C.; Gutmark, Ephraim; Wilson, Kenneth J.; and Smith, Robert A., 4,957,242, Cl. 239-590.000.
Wardle, William F., 4,958,331, Cl. 367-130.000.
U.S. Philips Corporation: *See*—
Alich, Thomas; Flisikowski, Peter; and Peemoller, Horst, 4,956,885, Cl. 5-431.000.
Allezard, Roland, 4,958,161, Cl. 342-122.000.
Brand, Hans-Wolfgang; Hennings, Detlef F. K.; Klee, Mareike K.; and Scheinemacher, Herbert J., 4,957,888, Cl. 501-134.000.
Brinkmeyer, Ernst, 4,957,365, Cl. 356-73.100.
De With, Peter H. N., 4,957,688, Cl. 358-133.000.
Heijman, Maritza G. J.; and Zalm, Peter C., 4,957,899, Cl. 505-1.000.
Hendrix, Machiel A. M.; Scheepers, Johannes A. M.; and Reijnders, Nicolaas H. G., 4,958,106, Cl. 315-208.000.
Hughes, John B., 4,958,123, Cl. 323-316.000.
Kuijk, Karel E.; and Stroomer, Martinus V. C., 4,958,152, Cl. 340-784.000.
Meijer, Egbert W.; Havinga, Edsko E.; and Rikken, Gerardus L. J. A., 4,958,087, Cl. 307-;425.000.
Sari, Hikmet, 4,958,360, Cl. 375-97.000.
Zwiers, Renso J. M.; Verhoeven, Johannes M. G.; and Amendt, Herman M. A., 4,957,663, Cl. 264-1.400.
United Technologies Corporation: *See*—
Paul, Roy D., deceased; and Pollock, Walter, 4,957,415, Cl. 416-245.00R.
Young, Edward L.; and Kapoor, Mohan L., 4,958,105, Cl. 315-169.300.
Universal Health Products, Inc.: *See*—
Morenings, Gerhard H., 4,957,480, Cl. 604-20.000.
University of Cincinnati: *See*—
Deutsch, Edward A.; and Libson, Karen F., 4,957,728, Cl. 424-1.100.
University of Connecticut: *See*—
Shaw, Brenda R.; and Creasy, Kenneth E., 4,957,593, Cl. 204-291.000.
University of Michigan, The: *See*—
Becchetti, Fred D., 4,958,078, Cl. 250-396.00R.
Counsell, Raymond E.; Longino, Marc A.; Weichert, Jamey P.; and Schwendner, Susan P., 4,957,729, Cl. 424-5.000.
University of Minnesota, Regents of the: *See*—
Knighton, David R., 4,957,742, Cl. 424-532.000.
University of Nebraska, The Board of Regents of the: *See*—
Winowiski, Thomas S., 4,957,748, Cl. 426-2.000.
University of Pennsylvania, Trustees of the: *See*—
Ulrich, Nathan T., 4,957,320, Cl. 294-106.000.
University of Pittsburgh: *See*—
Cano, Elmer R., 4,957,476, Cl. 600-7.000.
University of Tennessee Research Corporation, The: *See*—
Huang, Leaf, 4,957,735, Cl. 424-85.800.
UOP: *See*—
Grover, Bhadra S.; and Nagji, Moez M., 4,957,715, Cl. 423-228.000.
McCauley, John R., 4,957,889, Cl. 502-65.000.
Sachtler, Johann W. A.; Lawson, Randy J.; and Lambert, Susan L., 4,957,891, Cl. 502-61.000.
Yoo, Jin S.; Karch, John A.; Bhattacharyya, Alakananda A.; and Radlowski, Cecelia A., 4,957,718, Cl. 423-244.000.
Yoo, Jin S.; and Jaecker, John A., 4,957,892, Cl. 502-63.000.
Zemel, Haya; and Koch, Mark B., 4,958,015, Cl. 536-103.000.
Uota, Kosaku: *See*—
Morishita, Mitsuharu; Uota, Kosaku; and Yasukawa, Takeshi, 4,957,182, Cl. 180-79.100.
Upjohn Company, The: *See*—
Hiestand, Everett N.; Balog, Stephen; and Gleason, David D., 4,957,003, Cl. 73-818.000.

Urabe, Suehiro: *See*—
Matsuo, Isaya; Urabe, Suehiro; and Fujisawa, Eiichi, 4,957,071, Cl. 123-52.0MV.
Urakami, Tatsuhiro; Tanabe, Yoshimitsu; Yamaguchi, Keizaburo; and Yamaguchi, Akihiro, to Mitsui Toatsu Chemicals, Inc. Epoxy resins containing imido rings, production process thereof and epoxy resin compositions containing the same. 4,957,994, Cl. 528-90.000.
Urakami, Tsuneyuki; Aoshima, Shinichiro; and Tsuchiya, Yutaka, to Hamamatsu Photonics Kabushiki Kaisha. Apparatus for stabilizing the intensity of light. 4,958,354, Cl. 372-29.000.
Urayama, Takanaga: *See*—
Yoshiki, Kanetsugu; and Urayama, Takanaga, 4,957,202, Cl. 206-44.110.
Urushihara, Kazunobu: *See*—
Kimura, Hiroyuki; Kobayashi, Takeshi; Katsuma, Makoto; Urushihara, Kazunobu; Matsumura, Susumu; and Ohmura, Hiroshi, 4,958,217, Cl. 358-75.000.
Usami, Toshiro; Kamijo, Hiroyuki; Ohta, Takao; and Ogino, Masanobu, to Kabushiki Kaisha Toshiba. Defect-recognition processing apparatus. 4,958,373, Cl. 382-8.000.
Ushijima, Ryosuke: *See*—
Miyano, Tetsuji; Suzuki, Kunio; Ushijima, Ryosuke; and Nakagawa, Susumu, 4,958,024, Cl. 546-249.000.
Nakagawa, Susumu; Murase, Satoshi; Ushijima, Ryosuke; and Kato, Yoshiaki, 4,958,029, Cl. 548-430.000.
Ushiki, Hiroshi; and Iwasaki, Tetsuaki, to Kabushiki Kaisha Toshiba; and Tosbac Computer System Company Limited. Display control circuit. 4,958,151, Cl. 340-784.000.
Ushiyama, Yasuhiro. Loop transfer game device. 4,957,292, Cl. 273-159.000.
Ushizawa, Norihiko; and Shimomura, Takeshi, to Terumo Kabushiki Kaisha. Oxygen sensor. 4,957,615, Cl. 204-415.000.
Utah State University Foundation: *See*—
Bi, Qi; Stiles, Gardiner S.; and Huang, Chien M., 4,958,225, Cl. 358-133.000.
Uzick, Wolfram: *See*—
Graefe, Jurgen; Uzick, Wolfram; and Weinberg, Udo, 4,958,041, Cl. 556-480.000.
Valaasopoulos, Aristide; Thomas, Jean-Claude; and Dreyer, Christian, to Aluminium Pechiney. Process for constructing furnaces with open chambers, for avoiding deformation thereof. 4,957,428, Cl. 432-3.000.
Valducci, Roberto. Process for preparing etofibrate or similar compounds containing sustained release microgranules and products thus obtained. 4,957,746, Cl. 424-490.000.
Valentine, Sidney L.: *See*—
Hsu, Sawyer C-Y.; Daleo, Carlo V.; Valentine, Sidney L.; Fratis, James; and Fischer, Robert W., Jr., 4,957,333, Cl. 312-108.000.
Vallat, Jean-Noel: *See*—
Gubin, Jean; Chatelain, Pierre; Descamps, Marcel; Nisato, Dino; Inion, Henri; Lucchetti, Jean; Mahaux, Jean-Marie; and Vallat, Jean-Noel, 4,957,925, Cl. 514-299.000.
Valley, Jana. Anti-theft device for garments. 4,956,982, Cl. 70-59.000.
Vallourec Industries: *See*—
Barthelemy, Philippe; and Naturel, Christian, 4,957,542, Cl. 75-10.390.
Valster, Karl C.; and Reicks, Allen V., to Precision Pulley, Inc. Method of making wing pulleys. 4,956,914, Cl. 29-892.100.
Vance Products Incorporated: *See*—
Roemer, Frederick D., 4,957,479, Cl. 604-8.000.
van den Berg, Johannes C. M.: *See*—
Drijftholt, Jacob; and van den Berg, Johannes C. M., 4,957,758, Cl. 426-330.600.
Vandenberk, Jan: *See*—
Kennis, Ludo E. J.; Vandenberk, Jan; and Mertens, Josephus C., 4,957,916, Cl. 514-254.000.
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Vandeputte, Gilbert, to Engicom, Naamloze Vennootschap. Gas mask coupled to monolithic member with speech membrane. 4,957,106, Cl. 128-201.190.
van der Ham, Wim: *See*—
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Vandini, Aldo, to Koaladesign S.r.L. Device for associating a pair of planar parallel panels. 4,956,957, Cl. 52-584.000.
Van Doren, Jeffrey C.: *See*—
Pauly, Thomas E.; Van Doren, Jeffrey C.; Henessey, John P.; and Christiansen, James M., 4,958,280, Cl. 364-403.000.
van Eerde, Paul: *See*—
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Van Erden, Donald: *See*—
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van Erede, Paul: *See*—
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van Lengerich, Bernhard H., to Nabisco Brands, Inc. Extruder apparatus for producing an at least partially baked product having a cookie-like crumb structure including a post-extrusion radio frequency device. 4,957,041, Cl. 99-353.000.
van Lengerich, Bernhard H., to Nabisco Brands, Inc. Extruder and continuous mixer arrangement for producing an at least partially baked product having a cookie-like crumb structure including a post-extrusion microwave device. 4,957,042, Cl. 99-353.000.
Van Nutt, Charles: *See*—
Hurwitt, Steven D.; Wagner, Israel; Hieronymi, Robert; and Van Nutt, Charles, 4,957,605, Cl. 204-192.120.
Van Zanten, Egbert: *See*—
Mattas, Charles B.; Van Zanten, Egbert; and Szuba, Stefan P., 4,958,107, Cl. 315-289.000.
Varian Associates, Inc.: *See*—
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Varta Batterie Aktiengesellschaft: *See*—
Ruggeberg, Klaus; and Jose, Horst-Udo, 4,957,832, Cl. 429-164.000.
Vaughan, Robert A., to Standard Products Company, The. Front loading flush glass run system. 4,956,941, Cl. 49-440.000.
Veach, Susan K.: *See*—
Cochran, Stuart A.; Cin, David A.; and Veach, Susan K., 4,957,750, Cl. 426-19.000.
Venture Technologies, Inc.: *See*—
Miffitt, Donald C.; Tortola, Angelo; Sebor, Charles S.; and Halliday, Robert L., 4,957,291, Cl. 273-153.00R.
Veranian, Vagan D.: *See*—
Denisov, Vladimir F.; Gertseva, Marina I.; Ziberov, Valentin E.; Karapetian, Vadim K.; Sarkisian, Norik S.; Karbachinsky, Vladimir M.; Kharlamov, Oleg I.; Tsoi, Alexei D.; Tsyain, Mark I.; Romanov, Alexei A.; Veranian, Vagan D.; Khripin, Vasily D.; and Shafran, Larisa E., 4,957,512, Cl. 55-8.000.
Verclyte, Eddy; Meyns, Ignace; and Glorie, Patrick, to Picanol N.V. Pneumatic weft thread holder for a selvage device. 4,957,145, Cl. 139-434.000.
Verdier, Gerard: *See*—
Samarut, Jacques; Verdier, Gerard; Benchaibi, Miloud; Savatier, Pierre; Poncet, Didier; Flamant, Frederic; Xiao, Jiao-Hao; Thoraval, Pierrick; Chambonnet, Frederique; and Nigon, Victor, 4,957,865, Cl. 435-235.000.
Verhoeven, Johannes M. G.: *See*—
Zwiers, Renso J. M.; Verhoeven, Johannes M. G.; and Amendt, Herman M. A., 4,957,663, Cl. 264-1.400.
Verweirder, Gery G. R.: *See*—
De Busscher, Cyriel R. J.; Muijs, Cornelis G. M.; and Verweirder, Gery G. R., 4,956,967, Cl. 56-341.000.
Vetter, Kurt: *See*—
Medler, Eberhard; Phillipi, Siefried; Vetter, Kurt; Freudenreich, Ludwig; and Lippuner, Othmar, 4,957,782, Cl. 427-421.000.
Victor Hasselblad Aktiebolag: *See*—
Froberg, Stig O.; and Bengtson, Lars O., 4,958,182, Cl. 354-412.000.
Vident, Inc.: *See*—
Jinoian, Vanik N.; Morrow, Ray E.; and Whitehill, Wayne W., 4,957,435, Cl. 433-34.000.
Vignane, Pascal: *See*—
Laval, Francois; and Vignane, Pascal, 4,958,027, Cl. 548-264.800.
Vignau, Andre: *See*—
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Villarreal, Jose J. N. Recoverable self-supportable cribwork for slabs on prefabricated beams. 4,957,269, Cl. 249-24.000.
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Worthington, Paul A.; Crowley, Patrick J.; and Gravestock, Michael B., to Imperial Chemical Industries PLC. Triazoles including alkynyl substitution useful as fungicides or as plant growth regulating agents. 4,957,539, Cl. 71-92.000.
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Myers, Christopher S.; and Wozniak, Thomas H., 4,957,670, Cl. 264-40.100.
Wright State University: *See*—
Christolear, Max D., Jr., 4,957,281, Cl. 272-117.000.
Wronski, Michael W.: *See*—
Branigan, John T.; and Wronski, Michael W., 4,958,166, Cl. 343-771.000.
Wu, Jinrong: *See*—
Zeng, Kun; Wu, Jinrong; Yang, Sen; Yu, Zhenfen; and Zhu, Jiude, 4,957,114, Cl. 128-665.000.
Wukusick, Carl S.: *See*—
Krueger, Daniel D.; Kissinger, Robert D.; Menzies, Richard G.; and Wukusick, Carl S., 4,957,567, Cl. 148-12.70N.
Wulff, Richard F., to Castex Industries, Inc. Floor cleaner. 4,956,891, Cl. 15-320.000.
Wyatt, Michael A., to Honeywell Inc. Digital-to-analog converter. 4,958,159, Cl. 341-144.000.
Wysham, Douglas G., to Ramsey Foundation. One-handed percutaneous transluminal angioplasty steering device and method. 4,957,117, Cl. 604-95.000.
Xerox Corporation: *See*—
O'Neill, James F., 4,957,592, Cl. 156-644.000.
Xiao, Jiao-Hao: *See*—
Samarut, Jacques; Verdier, Gerard; Benchaibi, Miloud; Savatier, Pierre; Poncet, Didier; Flamant, Frederic; Xiao, Jiao-Hao; Thoraval, Pierrick; Chambonnet. Frederique; and Nigon, Victor, 4,957,865, Cl. 435-235.000.
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Yada, Shuhei: *See*—
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Yamachika, Hiroshi: *See*—
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Yamada, Kiyoshige; Mizuma, Takashi; and Kishino, Kohji, to Mazda Motor Corporation. Automobile side door assembly. 4,956,943, Cl. 49-503.000.
Yamada, Kunio; Tsukada, Shigeru; and Seki, Masao, to Fuji Xerox Co., Ltd. Method of gradation and selection of micro picture elements therefor in a picture display. 4,958,239, Cl. 358-457.000.
Yamada, Masaya, to Ibiden Co., Ltd. Process for producing second harmonic wave generating device. 4,957,589, Cl. 156-643.000.
Yamada, Sumito: *See*—
Suematsu, Koichi; Yamada, Sumito; Ohno, Shigeru; and Ito, Tadashi, 4,957,856, Cl. 430-518.000.
Yamada, Taiju: *See*—
Sawa, Takao; Okamura, Masami; Yamada, Taiju; Kusaka, Takao; and Sasaki, Hiroshi, 4,958,134, Cl. 333-12.000.
Yamada, Takanobu; Kawai, Noboyuki; and Kinoshita, Takeru, to Minolta Camera Co., Ltd. Developing device. 4,958,191, Cl. 355-245.000.
Yamada, Yasushi, to Konica Corporation. Document feeder with sheet edge regulating mechanism. 4,957,285, Cl. 271-3.100.
Yamagishi, Fumio: *See*—
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Yamaguchi, Akihiro: *See*—
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Yamaguchi, Hirohisa; and Mashimo, Akira, to Teac Corporation. Distortion eliminating circuit. 4,958,234, Cl. 358-327.000.
Yamaguchi, Keizaburo: *See*—
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Yamaguchi, Kouji: *See*—
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Yamaguchi, Mikio; and Maeda, Naoki, to Sumitomo Electric Industries, Ltd. Optical character reader for outputting a character from combinations of possible representations of the character. 4,958,379, Cl. 382-59.000.
Yamaguchi, Noboru: *See*—
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Okamura, Naokatsu; Yamaguchi, Noboru; Masuda, Shuji; and Kanou, Noboru, 4,956,983, Cl. 70-241.000.
Yamaguchi, Takeshi: *See*—
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Yamaha Corporation: *See*—
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Yamaha Hatsudoki Kabushiki Kaisha: *See*—
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Nakano, Tomio, 4,957,472, Cl. 474-203.000.
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Yamaha Katsudoki Kabushiki Kaisha: *See*—
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Yamamoto, Hidetoshi; Gotoh, Taiji; and Katoh, Yoshinori, to Mie Horo Co., Ltd. Device for joining piping materials. 4,956,904, Cl. 29-237.000.
Yamamoto, Katsumasa: *See*—
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Yamamoto, Shinichirou: *See*—
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Yamamoto, Takashi: *See*—
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Yamanaka, Toshihiro; Horie, Nobuyuki; Kobayashi, Shozou; Deguchi, Toshihisa; Yamaguchi, Takeshi; Maeda, Shigemi; Nishioka, Yoshiki; and Sugiura, Teruki, to Sharp Kabushiki Kaisha. Disk recording checking method for determining if a disk is defective by the number of errors present. 4,958,337, Cl. 369-58.000.
Yamane, Hidenobu: *See*—
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Yamashita, Hideaki; Hayamizu, Tadashi; and Tanaka, Kiichiro, to Matsushita Electric Industrial Co., Ltd. Printing apparatus with registration positioning plate. 4,958,199, Cl. 355-317.000.
Yamashita, Ichiro: *See*—
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Yamashita, Tsuyoshi: *See*—
Maeda, Takashi; Yamashita, Tsuyoshi; and Nakamura, Mitsuo, 4,957,797, Cl. 428-77.000.
Yamasaki, Arata: *See*—
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Yamaya, Masaaki: *See*—
Yoshioka, Hiroshi; Yamaya, Masaaki; Ohsaki, Hiromi; and Hayashida, Akira, 4,958,040, Cl. 556-467.000.
Yamazaki, Kazumasa; Mizuyama, Yaichiro; Horita, Takashi; and Suzuki, Shinichi, to Nippon Steel COrporation. Process for producing a zinc or zinc alloy coated steel sheet having excellent spot weldability. 4,957,594, Cl. 204-27.000.
Yamazaki, Kazutoshi: *See*—
Matsumura, Hideo; Nishino, Hirohito; Fukuyama, Hidetoshi; Yamazaki, Kazutoshi; and Suzuki, Hiromitsu, 4,957,614, Cl. 204-411.000.
Yamazaki, Shumpei, to Semiconductor Energy Laboratory Co., Ltd. Method of manufacturing a superconducting pattern by light irradiation. 4,957,900, Cl. 505-1.000.
Yaneza, Merle L. Toothbrushing assembly. 4,957,125, Cl. 132-309.000.
Yang, Sen: *See*—
Zeng, Kun; Wu, Jinrong; Yang, Sen; Yu, Zhenfen; and Zhu, Jiude, 4,957,114, Cl. 128-665.000.
Yard, John; and Strohmeier, Warren O., to Fischer & Porter Company. Coriolis-type flowmeter. 4,957,005, Cl. 73-861.380.
Yasuda, Akio; and Ito, Kengo, to Sony Corporation. Electrochromic display device. 4,957,352, Cl. 350-353.000.
Yasuda, Keiji; Kamijyo, Tetsuo; and Miyahara, Kazuhiro, to NGK Insulators, Ltd. Tunnel furnace height detector. 4,957,374, Cl. 374-142.000.
Yasuda, Sadahiro; and Nishiguchi, Yukihiro, to NEC Corporation. Comparator unit for data discrimination. 4,958,140, Cl. 340-146.200.
Yasukawa, Takeshi: *See*—
Morishita, Mitsuharu; Uota, Kosaku; and Yasukawa, Takeshi, 4,957,182, Cl. 180-79.100.
Yazaki Corporation: *See*—
Hatagishi, Yuji, 4,957,449, Cl. 439-364.000.
Yodice, Richard; and Lentz, Gregory A., to Lubrizol Corporation, The. Spin fiber lubricant compositions. 4,957,648, Cl. 252-8.600.

Yokoi, Takeshi, to Olympus Optical Co., Ltd. Ultrasonic diagnostic apparatus. 4,957,112, Cl. 128-662.060.

Yokouchi, Hiroshi, to Oki Electric Industry Co., Ltd. Instruction decoder for a variable byte processor. 4,958,275, Cl. 364-200.000.

Yokoya, Hisao, to Mitsubishi Denki Kabushiki Kaisha. Separator manufacturing apparatus. 4,957,423, Cl. 425-115.000.

Yokoyama, Fumitomo: *See*—
Kano, Takenori; Takemoto, Haruki; Niimi, Mamoru; Takase, Isao; and Yokoyama, Fumitomo, 4,957,195, Cl. 192-106.00F.

Yokoyama, Nobuyoshi. Gas cooking appliance. 4,957,096, Cl. 126-39.00H.

Yokoyama, Shotaro: *See*—
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Yonekawa, Takashi: *See*—
Komazawa, Osamu; Isogai, Shigetaka; Buma, Shuuichi; Onuma, Toshio; Yonekawa, Takashi; and Hattori, Katsuhiko, 4,957,309, Cl. 280-707.000.

Yoo, Jin S.; Karch, John A.; Bhattacharyya, Alakananda A.; and Radlowski, Cecelia A., to UOP. Process for reducing emissions of sulfur oxides and composition useful in same. 4,957,718, Cl. 423-244.000.

Yoo, Jin S.; and Jaecker, John A., to UOP. Process for combusting solid sulfur containing material. 4,957,892, Cl. 502-63.000.

York, Robert J.: *See*—
Sims, Richard L.; Baker, Billy S.; Dotson, Randy G.; York, Robert J.; and Herrell, Joey A., 4,958,235, Cl. 358-402.000.

Yoshida, Kazuetsu: *See*—
Futamoto, Masaaki; Honda, Yukio; Asada, Seiichi; Nishimura, Takashi; Yoshida, Kazuetsu; and Ishihara, Heigo, 4,957,825, Cl. 428-694.000.

Yoshida, Keiji, to Minolta Camera Kabushiki Kaisha. Automatic exposure control system of image duplicating apparatus. 4,958,189, Cl. 355-208.000.

Yoshida, Masashi; Suzuki, Katsuhisa; and Yoshikawa, Masaaki, to Nikkiso Co. Ltd. Semipermeable membrane and process for preparing same. 4,957,942, Cl. 521-62.000.

Yoshida, Satoshi: *See*—
Doi, Shinji; Yoshida, Satoshi; Matsunaga, Satoshi; Kawakami, Hiroaki; Kasuya, Takashige; Goseki, Yasuhide; and Karami, Yusuke, 4,957,774, Cl. 427-45.100.
Sakashita, Kiichiro; Nakahara, Toshiaki; Tanikawa, Hirohide; Matsushige, Naoki; Yoshida, Satoshi; Fujiwara, Masatsugu; and Mitsuhashi, Yasuo, 4,957,840, Cl. 430-106.600.

Yoshida, Shouki; and Shimada, Setsuo, to NEC Corporation. Transfer control equipment. 4,958,271, Cl. 364-200.000.

Yoshida, Shozo: *See*—
Kawamura, Michio; Shimada, Yasunori; Inoshita, Koichi; Yoshida, Shozo; Kawanabe, Toshiaki; Hattori, Haruo; Doi, Yukio; and Awano, Mamoru, 4,957,666, Cl. 264-4.700.

Yoshida, Toshio; Hirai, Masayoshi; Nishizawa, Teiuo; and Takamura, Masashi, to Fuji Photo Film Co., Ltd. Collapsible mounting type camera with zoom lens. 4,958,178, Cl. 354-195.120.

Yoshigae, Takeo: *See*—
Hikosaka, Akihide; Mimura, Tsuyoshi; Suzuki, Tomio; Yoshigae, Takeo; and Itoh, Shuzo, 4,957,545, Cl. 75-501.000.

Yoshikama, Kunihiko: *See*—
Masuyama, Fujimitsu; Daikoku, Takashi; Haneda, Hisao; Yoshikama, Kunihiko; Teranishi, Hiroshi; and Iseda, Atsuro, 4,957,701, Cl. 420-69.000.

Yoshikawa, Masaaki, to Yamaha Hatsudoki Kabushiki Kaisha. Valve operating system for engine. 4,957,470, Cl. 474-101.000.

Yoshikawa, Masaaki: *See*—
Yoshida, Masashi; Suzuki, Katsuhisa; and Yoshikawa, Masaaki, 4,957,942, Cl. 521-62.000.

Yoshiki, Kanetsugu; and Urayama, Takanaga, to Sunstar Kabushiki Kaisha. Commodity package with auxiliary container portion. 4,957,202, Cl. 206-44.110.

Yoshikumi, Chikao; Ohmura, Yoshio; Hirose, Fumio; Ikuzawa, Masanori; Matsunaga, Kenichi; Fujii, Takayoshi; Ohhara, Minoru; and Ando, Takao, to Kureha Kagaku Kogyo Kabushiki Kaisha. Pharmaceutical compositions containing a derivative of para-aminobenzoic acid as an active ingredient. 4,957,906, Cl. 514-42.000.

Yoshimoto, Taisuke: *See*—
Nagai, Teizi; Tokushima, Yasuo; Kubota, Sadao; Suzuki, Kenichirou; Fujitani, Yoshiyasu; Yoshimoto, Taisuke; Muraki, Hideaki; and Tachi, Hideo, 4,957,710, Cl. 422-171.000.

Yoshimura, Hiroshi: *See*—
Sugimura, Toshiya; and Yoshimura, Hiroshi, 4,958,287, Cl. 364-424.100.

Yoshimura, Masatomo: *See*—
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Yoshimura, Motonobu: *See*—
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Yoshioka, Hiroshi; Yamaya, Masaaki; Ohsaki, Hiromi; and Hayashida, Akira, to Shin-Etsu Chemical. Process for the preparation of diorganohalogenosilanes. 4,958,040, Cl. 556-467.000.

Yoshioka, Tatsuya: *See*—
Nakamura, Kazuhiro; Yoshioka, Tatsuya; Sawada, Ryoji; and Nakamura, Tomoji, 4,956,997, Cl. 73-182.000.

Young, David E.; and Davis, Kenneth P., to Protectair Limited. Orthopaedic body jackets. 4,957,103, Cl. 128-78.000.

Young, Edward L.; and Kapoor, Mohan L., to United Technologies Corporation. Row driver for EL panels and the like with inductance coupling. 4,958,105, Cl. 315-169.300.

Young, Richard D.: *See*—
Castrignano, Frank; Foote, James C., Jr.; Marowski, Robert E.; and Young, Richard D., 4,957,584, Cl. 156-361.000.

Young, Robert N.; and Zamboni, Robert, to Merck Frosst Canada, Inc. Benzoheterazoles. 4,957,932, Cl. 514-375.000.

Yrjala, Olavi A., to A. Ahlstrom Corporation. Method of producing chemically self-copying or self-containing paper. 4,957,778, Cl. 427-152.000.

Yu, Zhenfen: *See*—
Zeng, Kun; Wu, Jinrong; Yang, Sen; Yu, Zhenfen; and Zhu, Jiude, 4,957,114, Cl. 128-665.000.

Yuguchi, Hiroya: *See*—
Okonogi, Shigeo; Yuguchi, Hiroya; Tanai, Sumio; and Morimoto, Keiji, 4,957,764, Cl. 426-573.000.

Yushina, Yoshinori; Hasegawa, Jun; and Satoh, Hiromi, to Chiyoda Chemical Engineering & Constructions Co., Ltd. Cylindrical hollow carriers for microorganisms made of nonwoven fabric. 4,957,868, Cl. 435-288.000.

Zach, Reuven D.: *See*—
Nelson, Robert S.; Barbaric, Zoran L.; and Zach, Reuven D., 4,958,363, Cl. 378-85.000.

Zachary, Alain. Device for primary separation of grain in a combine harvester for cereals. 4,957,467, Cl. 460-69.000.

Zalm, Peter C.: *See*—
Heijman, Maritza G. J.; and Zalm, Peter C., 4,957,899, Cl. 505-1.000.

Zamboni, Robert: *See*—
Young, Robert N.; and Zamboni, Robert, 4,957,932, Cl. 514-375.000.

Zarate, Robert A.; Self, Richard E.; and Smith, Lee W., to Pacific Consolidated Industries. High speed pressure swing adsorption liquid oxygen/liquid nitrogen generating plant. 4,957,523, Cl. 62-13.000.

Zaremba, Norman S.; and Beyer, John P., to AG Communication Systems Corporation. Tool for repairing surface mounted components on printed circuit board. 4,956,911, Cl. 29-721.000.

Zarian, Jamshid, to Lumenyte International Corporation. Clad optical conduit and method of manufacture. 4,957,347, Cl. 350-96.320.

Zatulovsky, Lev M.: *See*—
Kravetsky, Dmitry Y.; Zatulovsky, Lev M.; Egorov, Leonid P.; Pelts, Boris B.; Okun, Leonid S.; Freiman, Efim A.; Averyanov, Viktor V.; and Alishoev, Alexandr L., 4,957,713, Cl. 422-249.000.

Zemel, Haya; and Koch, Mark B., to UOP. Preparation of crosslinked cyclodextrin resins with enhanced porosity. 4,958,015, Cl. 536-103.000.

Zeng, Kun; Wu, Jinrong; Yang, Sen; Yu, Zhenfen; and Zhu, Jiude. Diagnostic apparatus for intrinsic fluorescence of malignant tumor. 4,957,114, Cl. 128-665.000.

Zerillo, Michael A. Drapery actuator operated by lamp timer and hand-held wireless remote control. 4,958,112, Cl. 318-280.000.

Zhao, Rufa: *See*—
Fang, Hongsheng; Zheng, Yankang; Chen, Xiuyun; Chen, Donghao; and Zhao, Rufa, 4,957,702, Cl. 420-104.000.

Zheng, Yankang: *See*—
Fang, Hongsheng; Zheng, Yankang; Chen, Xiuyun; Chen, Donghao; and Zhao, Rufa, 4,957,702, Cl. 420-104.000.

Zhu, Jiude: *See*—
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Ziberov, Valentin E.: *See*—
Denisov, Vladimir F.; Gertseva, Marina I.; Ziberov, Valentin E.; Karapetian, Vadim K.; Sarkisian, Norik S.; Karbachinsky, Vladimir M.; Kharlamov, Oleg I.; Tsoi, Alexei D.; Tsysin, Mark I.; Romanov, Alexei A.; Veranian, Vagan D.; Khripin, Vasily D.; and Shafran, Larisa E., 4,957,312, Cl. 55-8.000.

Ziegler, George: *See*—
Bishop, Lawrence C.; and Ziegler, George, 4,958,284, Cl. 364-419.000.

Zielske, Alfred G., to Clorox Company, The. Acyloxynitrogen peracid precursors. 4,957,647, Cl. 252-186.380.

Ziemer, John H.: *See*—
Pahade, Ravindra F.; Ziemer, John H.; and Howell, John K., 4,957,524, Cl. 62-18.000.

Zollinger, Donovan J., to General Motors Corporation. Convoluted boot seal with anti-abrasion side wall ribs. 4,957,469, Cl. 464-175.000.

Zorgniotti, Adrian W. Improvements to obviate pure venous impotence. 4,957,104, Cl. 128-79.000.

Zust, Armin: *See*—
Frostl, Wolfgang; and Zust, Armin, 4,957,928, Cl. 514-318.000.

Zwiers, Renso J. M.; Verhoeven, Johannes M. G.; and Amendt, Herman M. A., to U.S. Philips Corp. Method of manufacturing optical components. 4,957,663, Cl. 264-1.400.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 18TH DAY OF SEPTEMBER, 1990

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Abe, Toyohiko: *See*—
Kohtoh, Noriaki; Abe, Toyohiko; and Fukuro, Hiroyoshi, Re. 33,342, Cl. 528-351.000.

ASQ Technology, Inc.: *See*—
Lee, Steven N.; and Kim, Jae Y., Re. 33,341, Cl. 414-404.000.

Automotive Products plc: *See*—
Bainbridge, Wilfred N.; and Young, Alastair J., Re. 33,336, Cl. 74-330.000.

Bainbridge, Wilfred N.; and Young, Alastair J., to Automotive Products plc. Change speed transmission. Re. 33,336, Cl. 74-330.000.

Bitter, Lowell E.; and Lundgren, Bryan L., to Donnelly Corporation. Crack detector for electrically conductive windshield. Re. 33,343, Cl. 219-509.000.

Bober, Vincent J.: *See*—
Sylvester, Robert D., Jr.; Horn, Paul C.; and Bober, Vincent J., Re. 33,345, Cl. 336-180.000.

C. & E. Fein GmbH & Co.: *See*—
Gentischer, Josef; and Rudolf, Boris, Re. 33,335, Cl. 51-168.000.

Coca-Cola Company, The: *See*—
Sedam, Jason K., Re. 33,338, Cl. 222-88.000.

Digitext, Inc.: *See*—
Lefler, Jerrold P.; and Woodard, Scott, Re. 33,337, Cl. 178-21.000.

Donnelly Corporation: *See*—
Bitter, Lowell E.; and Lundgren, Bryan L., Re. 33,343, Cl. 219-509.000.

Finnigan Corporation: *See*—
Stafford, George C., Re. 33,344, Cl. 250-281.000.

Fujitsu Limited: *See*—
Tsukada, Tetsuo; Shimobuchi, Hideyuki; and Yoshikawa, Takahiro, Re. 33,340, Cl. 400-196.100.

Fukuro, Hiroyoshi: *See*—
Kohtoh, Noriaki; Abe, Toyohiko; and Fukuro, Hiroyoshi, Re. 33,342, Cl. 528-351.000.

Gentischer, Josef; and Rudolf, Boris, to C. & E. Fein GmbH & Co. Device for attaching a tool. Re. 33,335, Cl. 51-168.000.

GFS Manufacturing Company, Inc.: *See*—
Sylvester, Robert D., Jr.; Horn, Paul C.; and Bober, Vincent J., Re. 33,345, Cl. 336-180.000.

Heidrich, Klaus; Krewitt, Alfred; Loos, Kurt; and Ipithan, Fritz, to Kabelschlepp Gesellschaft mit Beschrankter Haftung. Chain for supporting energy conveying means, and chain link therefor. Re. 33,339, Cl. 248-51.000.

Horn, Paul C.: *See*—
Sylvester, Robert D., Jr.; Horn, Paul C.; and Bober, Vincent J., Re. 33,345, Cl. 336-180.000.

Ipithan, Fritz: *See*—
Heidrich, Klaus; Krewitt, Alfred; Loos, Kurt; and Ipithan, Fritz, Re. 33,339, Cl. 248-51.000.

Kabelschlepp Gesellschaft mit Beschrankter Haftung: *See*—
Heidrich, Klaus; Krewitt, Alfred; Loos, Kurt; and Ipithan, Fritz, Re. 33,339, Cl. 248-51.000.

Kim, Jae Y.: *See*—
Lee, Steven N.; and Kim, Jae Y., Re. 33,341, Cl. 414-404.000.

Kohtoh, Noriaki; Abe, Toyohiko; and Fukuro, Hiroyoshi, to Nissan Chemical Industries Ltd. Liquid crystal aligning agent from tetracarboxylic acid dianhydride, diamine and monoamine. Re. 33,342, Cl. 528-351.000.

Krewitt, Alfred: *See*—
Heidrich, Klaus; Krewitt, Alfred; Loos, Kurt; and Ipithan, Fritz, Re. 33,339, Cl. 248-51.000.

Lee, Steven N.; and Kim, Jae Y., to ASQ Technology, Inc. Wafer transfer apparatus. Re. 33,341, Cl. 414-404.000.

Lefler, Jerrold P.; and Woodard, Scott, to Digitext, Inc. Stenographic translation system. Re. 33,337, Cl. 178-21.000.

Loos, Kurt: *See*—
Heidrich, Klaus; Krewitt, Alfred; Loos, Kurt; and Ipithan, Fritz, Re. 33,339, Cl. 248-51.000.

Lundgren, Bryan L.: *See*—
Bitter, Lowell E.; and Lundgren, Bryan L., Re. 33,343, Cl. 219-509.000.

Nelson, James A., to Ryko Manufacturing Company. Vehicle wash and dryer. Re. 33,334, Cl. 15-302.000.

Nissan Chemical Industries Ltd.: *See*—
Kohtoh, Noriaki; Abe, Toyohiko; and Fukuro, Hiroyoshi, Re. 33,342, Cl. 528-351.000.

Rudolf, Boris: *See*—
Gentischer, Josef; and Rudolf, Boris, Re. 33,335, Cl. 51-168.000.

Ryko Manufacturing Company: *See*—
Nelson, James A., Re. 33,334, Cl. 15-302.000.

Sedam, Jason K., to Coca-Cola Company, The. Membrane seal and knife combination for a post-mix beverage dispensing system. Re. 33,338, Cl. 222-88.000.

Shimobuchi, Hideyuki: *See*—
Tsukada, Tetsuo; Shimobuchi, Hideyuki; and Yoshikawa, Takahiro, Re. 33,340, Cl. 400-196.100.

Stafford, George C., to Finnigan Corporation. Apparatus and method for detecting negative ions. Re. 33,344, Cl. 250-281.000.

Sylvester, Robert D., Jr.; Horn, Paul C.; and Bober, Vincent J., to GFS Manufacturing Company, Inc. Toroid transformers and secondary windings. Re. 33,345, Cl. 336-180.000.

Tsukada, Tetsuo; Shimobuchi, Hideyuki; and Yoshikawa, Takahiro, to Fujitsu Limited. Color printer having apparatus for shifting ink ribbon. Re. 33,340, Cl. 400-196.100.

Woodard, Scott: *See*—
Lefler, Jerrold P.; and Woodard, Scott, Re. 33,337, Cl. 178-21.000.

Yoshikawa, Takahiro: *See*—
Tsukada, Tetsuo; Shimobuchi, Hideyuki; and Yoshikawa, Takahiro, Re. 33,340, Cl. 400-196.100.

Young, Alastair J.: *See*—
Bainbridge, Wilfred N.; and Young, Alastair J., Re. 33,336, Cl. 74-330.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Ferguson, James L. Light modulator demodulator and method of communication employing the same. B1 1,032,521, 9-18-90, Cl. 350-334.000.

Ferguson, James L. Method and apparatus for converting phase-modulated light to amplitude-modulated light and communication method and apparatus employing the same. B1 4,540,243, 9-18-90, Cl. 350-337.000.

Jung, Werner, to Katrapat AG. Device for carrying flexible cables or pipes from a fixed connection point to a mobile consumer by means of a flexible tube. B1 3,957,084, 9-18-90, Cl. 138-136.000.

Katrapat AG: *See*—
Jung, Werner, B1 3,957,084, Cl. 138-136.000.

LIST OF DESIGN PATENTEES

Acme Boot Co., Inc.: *See*—
Cummings, Craig C., 310,598, Cl. D2-318.000.
Air Products and Chemicals Inc.: *See*—
Hoffman, Gregory C., 310,629, Cl. D9-352.000.
Aizawa, Genya; and Ono, Kakuhisa. Sunvisor for vehicles. 310,653, 9-18-90, Cl. D12-191.000.
Alfa Romeo Auto S.p.A.: *See*—
Cressoni, Ermanno, 310,650, Cl. D12-163.000.
American Cyanamid Company: *See*—
Petersen, Bryan E.; and Kanceljak, Michael, 310,701, Cl. D22-119.000.
Petersen, Bryan E.; and Kanceljak, Michael, 310,702, Cl. D22-119.000.
Ancona, Bruce: *See*—
Ancona, Jane; and Ancona, Bruce, 310,749, Cl. D34-44.000.
Ancona, Jane; and Ancona, Bruce, to M. Kamenstein, Inc. Tool caddy. 310,749, 9-18-90, Cl. D34-44.000.
Andre Desrosiers Designer Industriel (ADDI) Inc.: *See*—
Desrosiers, Andre , 310,612, Cl. D7-307.000.
Anton, Edward R.: *See*—
Sielck, Henry A.; and Anton, Edward R., 310,730, Cl. D27-195.000.
Aoyama, Minoru, to Canon Kabushiki Kaisha. Toner case for electrophotographic copier. 310,683, 9-18-90, Cl. D18-43.000.
Apotheloz, Christophe: *See*—
Fellmann, Hans-Rudolf; and Apotheloz, Christophe, 310,662, Cl. D14-106.000.
Arai, Takuya, to Fuji Photo Film Co., Ltd. Packing bag for disposable camera. 310,625, 9-18-90, Cl. D9-305.000.
Aranibar, Ernesto E., to Shelfco, Inc. Bracket for closet shelf support rod. 310,623, 9-18-90, Cl. D8-380.000.
Armellin, Giancarlo, to Pirelli Coordinamento Pneumatici S.p.A. Tire. 310,648, 9-18-90, Cl. D12-146.000.
Associated Mills Inc.: *See*—
Heiligenstein, Luc; Geneve, Francois; and Melamed, Stephen, 310,717, Cl. D24-38.000.
AT&T Company: *See*—
Fortune, Duane D.; Joffe, Richard M.; Mack, Henry J., Jr.; McGarvey, John N.; and Zambelli, Michael P., 310,665, Cl. D14-140.000.
Axell, John, to Spine-O-Pedic Cushions, Inc. Driver's support cushion. 310,608, 9-18-90, Cl. D6-601.000.
Axelrod, Herbert R. Aerial toy. 310,691, 9-18-90, Cl. D21-86.000.
Baby Relax: *See*—
Julien, Francois, 310,645, Cl. D12-129.000.
Bakic, Karena, to Cosmede Anstalt. Cosmetic case. 310,736, 9-18-90, Cl. D28-82.000.
Bakic, Karena, to Cosmede Anstalt. Cosmetic stick container. 310,737, 9-18-90, Cl. D28-88.000.
Balek, Lynn A., to LTL Industries Ltd. Vehicle battery holder. 310,658, 9-18-90, Cl. D13-119.000.
Beisang, Arthur A., III, to Genetic Laboratories, Inc. Nose tube anchoring strip. 310,721, 9-18-90, Cl. D24-49.000.
Berfield, Robert C.; and Seasholtz, Craig A., to Shop-Vac Corporation. Dolly. 310,746, 9-18-90, Cl. D34-23.000.
Berger, Jeffery A. Simulative toy coaster. 310,685, 9-18-90, Cl. D21-74.000.
Berracasa, Abner, to Capitol Trading S.A. Tape applicator. 310,687, 9-18-90, Cl. D19-69.000.
Bobber Tech, Inc.: *See*—
Jones, Robert S., 310,700, Cl. D21-238.000.
Bradford, Rodney; and Brantley, Lott W. Inflatable, reflective solar oven. 310,657, 9-18-90, Cl. D13-102.000.
Brantley, Lott W.: *See*—
Bradford, Rodney; and Brantley, Lott W., 310,657, Cl. D13-102.000.
Bratasevec, Vid, to Proizvodnja in prodaja igrac, pisal, kovinskih in plasticnih izdelkov "Mehano", p.o. Electronic typewriter. 310,680, 9-18-90, Cl. D18-1.000.
Bratasevec, Vid, to Proizvodnja in Prodaja Igrac, Pisal, Kovinskih in Plasticnih Izdelkow "Mehano", P.O. Typewriter. 310,681, 9-18-90, Cl. D18-1.000.
Broden, Bengt-Inge. Cannula for withdrawing a test sample from a test tube. 310,722, 9-18-90, Cl. D24-51.000.
Brown, Michael G. Thumb protector. 310,738, 9-18-90, Cl. D29-20.000.
Burger, Annette. Caped leotard. 310,596, 9-18-90, Cl. D2-29.000.
Burkhardt, George J. Orthopedic cervical pillow. 310,609, 9-18-90, Cl. D6-601.000.
Bycraft, John T.: *See*—
Pomeroy, Charles; and Bycraft, John T., 310,604, Cl. D6-347.000.
Byriel, Ole, to Eveline A/S. Soap dispenser combined with a brush. 310,601, 9-18-90, Cl. D4-114.000.
Cain, Ann S., to 'totes', incorporated. Umbrella handle. 310,599, 9-18-90, Cl. D3-12.000.
Campbell, Egbert. Spinning toy. 310,693, 9-18-90, Cl. D21-96.000.
Canon Kabushiki Kaisha: *See*—
Aoyama, Minoru, 310,683, Cl. D18-43.000.
Capitol Trading S.A.: *See*—
Berracasa, Abner, 310,687, Cl. D19-69.000.
Capuano, Frank G.: *See*—
DePaul, Richard E.; and Capuano, Frank G., 310,633, Cl. D9-416.000.
Charles, Jeffrey R. Multiple function image switching attachment for a telescope or similar article. 310,676, 9-18-90, Cl. D16-134.000.
Choe, Yoo H. Bicycle wheel spoke. 310,655, 9-18-90, Cl. D12-213.000.
Clevenhagen, Robert L., to Figgie International Inc. Web for a baseball glove. 310,739, 9-18-90, Cl. D29-21.000.
CMB Packaging (UK) Limited: *See*—
Rayner, Adrien P., 310,628, Cl. D9-352.000.
Coleman Outdoor Products, Inc.: *See*—
Stearns, David K., 310,729, Cl. D26-110.000.
Colson Castors (Europe) Limited: *See*—
Screen, Stafford T., 310,622, Cl. D8-375.000.
Cooper, Hal W. Upright hoop unit for a lawn golf game. 310,698, 9-18-90, Cl. D21-202.000.
Cosmede Anstalt: *See*—
Bakic, Karena, 310,736, Cl. D28-82.000.
Bakic, Karena, 310,737, Cl. D28-88.000.
Cressoni, Ermanno, to Alfa Romeo Auto S.p.A. Front grill for an automotive vehicle. 310,650, 9-18-90, Cl. D12-163.000.
Cross, Patrick. Bag holder. 310,745, 9-18-90, Cl. D34-6.000.
Cummings, Craig C., to Acme Boot Co., Inc. Blocker sole with tap insert. 310,598, 9-18-90, Cl. D2-318.000.
Czechowski, Phillip M.: *See*—
Gonzalez, Cecilio; Gonzalez, Carlos; Massi, Michael; and Czechowski, Phillip M., 310,694, Cl. D21-96.000.
Davis, Raymond H.; and Mathisen, Corby K., to H. J. Heinz Company. Bottle. 310,631, 9-18-90, Cl. D9-404.000.
De La Cruz, Richard: *See*—
Parente, Richard; and De La Cruz, Richard, 310,699, Cl. D21-219.000.
Del Fresno, Miguel L., to Oficina de Investigacion Agrupada, S.A. Fan heater. 310,712, 9-18-90, Cl. D23-335.000.
DePaul, Richard E.; and Capuano, Frank G., to Somerville Packaging Corporation. Ice cream carton. 310,633, 9-18-90, Cl. D9-416.000.
Desrosiers, Andre , to Andre Desrosiers Designer Industriel (ADDI) Inc. Water refrigeration and dispensing unit. 310,612, 9-18-90, Cl. D7-307.000.
Dinand, Pierre, to Etablissements Bernard Lalande. Bottle for perfume, toilet water or the like. 310,626, 9-18-90, Cl. D9-322.000.
Dixon, Linda H., to E.R. Carpenter Company, Inc. Anti-snoring pillow. 310,610, 9-18-90, Cl. D6-601.000.
Dolwick, Franklin M., to Walter Lorenz Surgical Instruments, Inc. Temporomandibular joint disc scissors. 310,714, 9-18-90, Cl. D24-10.000.
Donovan, William P. Baby bottle. 310,719, 9-18-90, Cl. D24-47.000.
E.R. Carpenter Company, Inc.: *See*—
Dixon, Linda H., 310,610, Cl. D6-601.000.
Eichler, Volker: *See*—
Schott, Alfred; Reichenberger, Roland; Eichler, Volker; and Schulz, Horst, 310,659, Cl. D13-163.000.
Eldon Industries, Inc.: *See*—
Evenson, Mel, 310,689, Cl. D19-90.000.
Embree, Donald; and Hamann, David L., to Rubbermaid Incorporated. Parts drawer. 310,748, 9-18-90, Cl. D34-40.000.
Esslinger, Hartmut, to NeXT, Inc. Central processing unit for computer. 310,661, 9-18-90, Cl. D14-102.000.
Etablissements Bernard Lalande: *See*—
Dinand, Pierre, 310,626, Cl. D9-322.000.
Eveline A/S: *See*—
Byriel, Ole, 310,601, Cl. D4-114.000.
Evenson, Mel, to Eldon Industries, Inc. Holder for sheet material. 310,689, 9-18-90, Cl. D19-90.000.
Fedawa, Wayne C. Computer aided design matrix menu for overlaying a digitizing tablet. 310,663, 9-18-90, Cl. D14-114.000.
Fellmann, Hans-Rudolf; and Apotheloz, Christophe, to Zellweger Uster Ltd. Terminal for signal processing in textile laboratories. 310,662, 9-18-90, Cl. D14-106.000.
Ferrari, Dario, to Intercos Italia S.p.A. Cosmetic container. 310,735, 9-18-90, Cl. D28-76.000.
Figgie International Inc.: *See*—
Clevenhagen, Robert L., 310,739, Cl. D29-21.000.
Finkiewicz, Daniel J.: *See*—
Gradecki, Raymond J.; Sorensen, Gerald R.; and Finkiewicz, Daniel J., 310,624, Cl. D8-395.000.
Fletcher, Sylvester J.; and Lee, Kermit J. Refuse container. 310,744, 9-18-90, Cl. D34-1.000.
Fortune, Duane D.; Joffe, Richard M.; Mack, Henry J., Jr.; McGarvey, John N.; and Zambelli, Michael P., to AT&T Company. Controller housing. 310,665, 9-18-90, Cl. D14-140.000.
Fratelli Guzzini S.p.A.: *See*—
Pozzi, Ambrogio, 310,614, Cl. D7-317.000.
Pozzi, Ambrogio, 310,617, Cl. D7-538.000.
Friel, Daniel D. Knife sharpener. 310,620, 9-18-90, Cl. D8-93.000.
Fuji Photo Film Co., Ltd.: *See*—
Arai, Takuya, 310,625, Cl. D9-305.000.
Gallanis, George P., to Wahl Clipper Corporation. Hair trimmer. 310,734, 9-18-90, Cl. D28-53.000.
Geka Brush Corporation: *See*—
Hutton, Stanley, 310,632, Cl. D9-412.000.
Gelinas, Ralph J., to Triune Research Corporation. Hair blower. 310,733, 9-18-90, Cl. D28-13.000.
Genetic Laboratories, Inc.: *See*—
Beisang, Arthur A., III, 310,721, Cl. D24-49.000.

Geneve, Francois: *See—*
Heiligenstein, Luc; Geneve, Francois; and Melamed, Stephen, 310,717, Cl. D24-38.000.
Gerber Garment Technology, Inc.: *See—*
Gerber, Heinz J., 310,639, Cl. D10-46.000.
Gerber, Heinz J., to Gerber Garment Technology, Inc. X, Y plotter. 310,639, 9-18-90, Cl. D10-46.000.
Giambrone, Harry J., to Spalding & Evenflo Companies, Inc. Stroller wheel hub cap. 310,654, 9-18-90, Cl. D12-211.000.
Gillfillan, Patricia B.: *See—*
Tacquard, Timothy L.; and Gillfillan, Patricia B., 310,686, Cl. D19-62.000.
Glaser, Jerry. Screw chuck. 310,673, 9-18-90, Cl. D15-140.000.
Gonzalez, Carlos: *See—*
Gonzalez, Cecilio; Gonzalez, Carlos; Massi, Michael; and Czechowski, Phillip M., 310,694, Cl. D21-96.000.
Gonzalez, Cecilio; Gonzalez, Carlos; Massi, Michael; and Czechowski, Phillip M. Spinning toy assembly. 310,694, 9-18-90, Cl. D21-96.000.
Gradecki, Raymond J.; Sorensen, Gerald R.; and Finkiewicz, Daniel J., to National Creative Merchandising Corp. Retaining clip. 310,624, 9-18-90, Cl. D8-395.000.
Grow, Robert D. Finger grip for bicycle brake levers. 310,651, 9-18-90, Cl. D12-179.000.
Guardian Products, Inc.: *See—*
Rose, Eric P., 310,646, Cl. D12-130.000.
H. J. Heinz Company: *See—*
Davis, Raymond H.; and Mathisen, Corby K., 310,631, Cl. D9-404.000.
Hamann, David L.: *See—*
Embree, Donald; and Hamann, David L., 310,748, Cl. D34-40.000.
Harker, Michael. Aerial toy. 310,692, 9-18-90, Cl. D21-86.000.
Harvey, Jean S.: *See—*
Harvey, Philip R.; and Harvey, Jean S., 310,672, Cl. D15-66.000.
Harvey, Philip R.; and Harvey, Jean S. Loom frame or similar article. 310,672, 9-18-90, Cl. D15-66.000.
Hatzipanagos, George. Multiple picture frame. 310,602, 9-18-90, Cl. D6-301.000.
Hayakawa, Futomi; and Nawata, Tadashi, to Kabushiki Kaisha Hybec. Halogen lamp. 310,725, 9-18-90, Cl. D26-2.000.
Hayes, Ronald G.: *See—*
Heren, Lawrence P.; and Hayes, Ronald G., 310,706, Cl. D23-226.000.
Heiligenstein, Luc; Geneve, Francois; and Melamed, Stephen, to Associated Mills Inc. Water jet for producing whirlpool action in bathtubs. 310,717, 9-18-90, Cl. D24-38.000.
Hengesbach, Robert W. Combined reversible sprinkler nozzle and support ring. 310,708, 9-18-90, Cl. D23-213.000.
Heren, Lawrence P.; and Hayes, Ronald G., to L. R. Nelson Company. Hose nozzle. 310,706, 9-18-90, Cl. D23-226.000.
Hoffman, Gregory C., to Air Products and Chemicals Inc. Vacuum furnace bottle. 310,629, 9-18-90, Cl. D9-352.000.
Holterscheidt, Siegfried, to Walter Henkels GmbH. Separable key chain. 310,600, 9-18-90, Cl. D3-62.000.
Hutton, Stanley, to Geka Brush Corporation. Bottle. 310,632, 9-18-90, Cl. D9-412.000.
Intercos Italia S.p.A.: *See—*
Ferrari, Dario, 310,735, Cl. D28-76.000.
Interlego A.G.: *See—*
Kushner, Philip M.; and Kyster, Steen, 310,695, Cl. D21-140.000.
Ishida, Katsuhiro, to Sharp Corporation. Keyboard for programmable controller. 310,660, 9-18-90, Cl. D14-100.000.
Isogai, Shunji, to Sugiyasu Industries Co., Ltd. Container transfer lift. 310,747, 9-18-90, Cl. D34-28.000.
Itoh, Kunio, to Pentel Kabushiki Kaisha. Pen cap or similar article. 310,684, 9-18-90, Cl. D19-57.000.
Jack-Post Corporation: *See—*
Pomeroy, Charles; and Bycraft, John T., 310,604, Cl. D6-347.000.
Jackson, Ron, to Pacific Research & Development Corp. UV lamp for curing fingernail coatings. 310,724, 9-18-90, Cl. D24-68.000.
Jado Bathroom and Hardware Manufacturing Corp.: *See—*
Jans, Franz W., 310,709, Cl. D23-250.000.
Jans, Franz W., to Jado Bathroom and Hardware Manufacturing Corp. Faucet handle. 310,709, 9-18-90, Cl. D23-250.000.
Joffe, Richard M.: *See—*
Fortune, Duane D.; Joffe, Richard M.; Mack, Henry J., Jr.; McGarvey, John N.; and Zambelli, Michael P., 310,665, Cl. D14-140.000.
Johnson, Charles R. Insect guard. 310,703, 9-18-90, Cl. D22-122.000.
Johnson, Douglas. Boot and shoe dryer. 310,742, 9-18-90, Cl. D32-58.000.
Jones, Robert S., to Bobber Tech, Inc. Bouyant belt. 310,700, 9-18-90, Cl. D21-238.000.
Julien, Francois, to Baby Relax. Convertible baby stroller. 310,645, 9-18-90, Cl. D12-129.000.
Kabushiki Kaisha Hybec: *See—*
Hayakawa, Futomi; and Nawata, Tadashi, 310,725, Cl. D26-2.000.
Kabushiki Kaisha Toshiba: *See—*
Kobayashi, Masahiko; and Yamamoto, Kazuharu, 310,667, Cl. D14-163.000.
Murai, Kanji; and Matsumoto, Jun, 310,616, Cl. D7-351.000.
Takada, Toshio, 310,668, Cl. D14-163.000.
Yamamoto, Kazuharu, 310,666, Cl. D14-163.000.
Kagayama, Joe, to Tsuyama Mfg. Co., Ltd. Bicycle exerciser. 310,697, 9-18-90, Cl. D21-194.000.
Kanceljak, Michael: *See—*
Petersen, Bryan E.; and Kanceljak, Michael, 310,701, Cl. D22-119.000.
Petersen, Bryan E.; and Kanceljak, Michael, 310,702, Cl. D22-119.000.
Keller, H. Thomas, to Rosalco, Inc. Vanity bench. 310,603, 9-18-90, Cl. D6-349.000.
Keller, H. Thomas, to Rosalco, Inc. Vanity chair. 310,606, 9-18-90, Cl. D6-380.000.
Kira, Yasuhiro, to Nippon Gakki Seizo Kabushiki Kaisha. Electronic wind instrument. 310,679, 9-18-90, Cl. D17-10.000.
Kitai, Isao; Matsuda, Kenichi; and Ogasawara, Mikio, to Sharp Corporation. Bread baking machine. 310,615, 9-18-90, Cl. D7-348.000.
Klein, Max, to Tech Paper, Inc. Fan housing with filter compartment. 310,713, 9-18-90, Cl. D23-381.000.
Kobayashi, Masahiko; and Yamamoto, Kazuharu, to Kabushiki Kaisha Toshiba. Combined tape player and tuner. 310,667, 9-18-90, Cl. D14-163.000.
Koehler, Richard L.; and Koehler, Willie E. Tricycle. 310,644, 9-18-90, Cl. D12-112.000.
Koehler, Willie E.: *See—*
Koehler, Richard L.; and Koehler, Willie E., 310,644, Cl. D12-112.000.
Kohler Co.: *See—*
Poulson, Keith L., 310,710, Cl. D23-283.000.
Kulp, Jack H., to Traffix Devices, Inc. Traffic channelizer or the like. 310,642, 9-18-90, Cl. D10-109.000.
Kushner, Philip M.; and Kyster, Steen, to Interlego A.G. Toy trailer. 310,695, 9-18-90, Cl. D21-140.000.
Kwon, Sun E., to Total Design Corporation. Collapsible chair. 310,605, 9-18-90, Cl. D6-368.000.
Kyster, Steen: *See—*
Kushner, Philip M.; and Kyster, Steen, 310,695, Cl. D21-140.000.
L. R. Nelson Company: *See—*
Heren, Lawrence P.; and Hayes, Ronald G., 310,706, Cl. D23-226.000.
Lee, Kermit J.: *See—*
Fletcher, Sylvester J.; and Lee, Kermit J., 310,744, Cl. D34-1.000.
Lee, Richard D. Roof module for emergency vehicles. 310,649, 9-18-90, Cl. D12-156.000.
LGS Corporation: *See—*
Lieptz, Nathan S., 310,731, Cl. D24-23.000.
Lieptz, Nathan S., to LGS Corporation. Pill splitter. 310,731, 9-18-90, Cl. D24-23.000.
Lomeli's Statuary, Inc.: *See—*
Morando, Aturo, 310,643, Cl. D11-148.000.
Long, Daniel C.; and Welch, Dale G., to Unico Products. Bib. 310,597, 9-18-90, Cl. D2-229.000.
LTL Industries Ltd.: *See—*
Balek, Lynn A., 310,658, Cl. D13-119.000.
Lu Huang C. Combined folding binoculars and AM/FM radio. 310,675, 9-18-90, Cl. D16-133.000.
Lu, James. Lamp. 310,727, 9-18-90, Cl. D26-63.000.
Lu, James. Desk lamp or similar article. 310,728, 9-18-90, Cl. D26-65.000.
M. Kamenstein, Inc.: *See—*
Ancona, Jane; and Ancona, Bruce, 310,749, Cl. D34-44.000.
Mack, Henry J., Jr.: *See—*
Fortune, Duane D.; Joffe, Richard M.; Mack, Henry J., Jr.; McGarvey, John N.; and Zambelli, Michael P., 310,665, Cl. D14-140.000.
Mannschreck, Susan N. Disposable pet litter housing. 310,740, 9-18-90, Cl. D30-161.000.
Manuel, Andrew V. Beverage container. 310,627, 9-18-90, Cl. D9-325.000.
Massi, Michael: *See—*
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Mathisen, Corby K.: *See—*
Davis, Raymond H.; and Mathisen, Corby K., 310,631, Cl. D9-404.000.
Matsuda, Kenichi: *See—*
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Matsumoto, Jun: *See—*
Murai, Kanji; and Matsumoto, Jun, 310,616, Cl. D7-351.000.
McCullough, John W. Decorative lamp for potted plant. 310,726, 9-18-90, Cl. D26-49.000.
McGarvey, John N.: *See—*
Fortune, Duane D.; Joffe, Richard M.; Mack, Henry J., Jr.; McGarvey, John N.; and Zambelli, Michael P., 310,665, Cl. D14-140.000.
Meelen, Hans T., to U.S. Philips Corporation. Electric shaver. 310,732, 9-18-90, Cl. D28-49.000.
Melamed, Stephen: *See—*
Heiligenstein, Luc; Geneve, Francois; and Melamed, Stephen, 310,717, Cl. D24-38.000.
Miller, David L.; and Vatnsdal, Gene. Package of rescue balloon kits. 310,641, 9-18-90, Cl. D10-109.000.
Minnesota Mining and Manufacturing Company: *See—*
Windorski, David C., 310,688, Cl. D19-86.000.
Modublox & Co., Inc.: *See—*
Sheriff, Jack W., 310,670, Cl. D14-230.000.
Monta, Akihito, to Sumitomo Rubber Industries, Ltd. Automobile tire. 310,647, 9-18-90, Cl. D12-146.000.

Morando, Aturo, to Lomeli's Statuary, Inc. Planter. 310,643, 9-18-90, Cl. D11-148.000.

Moses, Phillip J. Litter removal tool or the like. 310,741, 9-18-90, Cl. D30-162.000.

Murai, Kanji; and Matsumoto, Jun, to Kabushiki Kaisha Toshiba. Microwave oven. 310,616, 9-18-90, Cl. D7-351.000.

Murphy, Patrick J., to Quaker Oats Company, The. Monitor receiver. 310,664, 9-18-90, Cl. D14-137.000.

Nagata Kogyo Kabushiki Kaisha: *See*—
Nagata, Yoichi, 310,652, Cl. D12-191.000.

Nagata, Yoichi, to Nagata Kogyo Kabushiki Kaisha. Side visor for automobile. 310,652, 9-18-90, Cl. D12-191.000.

National Creative Merchandising Corp.: *See*—
Gradecki, Raymond J.; Sorensen, Gerald R.; and Finkiewicz, Daniel J., 310,624, Cl. D8-395.000.

Nawata, Tadashi: *See*—
Hayakawa, Futomi; and Nawata, Tadashi, 310,725, Cl. D26-2.000.

NEC Corporation: *See*—
Tsumuro, Yoshitaka, 310,682, Cl. D18-40.000.

NeXT, Inc.: *See*—
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Nicosia, John S., Sr., deceased; and by Nicosia, John S., Jr., executor. Fishing lure. 310,704, 9-18-90, Cl. D22-130.000.

Nielson, Rhea A. Baby weaning aid. 310,720, 9-18-90, Cl. D24-47.000.

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24.1 4,957,093
4,957,094
89 4,957,095

CLASS 126

39 H 4,957,096
373 4,957,097
531 4,957,098

CLASS 127

38 4,957,563
46.3 4,957,564
68 4,957,565

CLASS 128

24 A 4,957,099
4,957,100
66 4,957,101
68 4,957,102
78 4,957,103
79 4,957,104
96.1 4,957,105
201.19 4,957,106
204.21 4,957,107
632 4,957,108
640 4,957,109
642 4,957,110
662.06 4,957,111
4,957,112
665 4,957,113
4,957,114
696 4,957,115
731 4,957,116
785 4,957,118
832 4,957,119
849 4,957,120
897 4,957,121

CLASS 131

281 4,957,122

CLASS 132

200 4,957,124
309 4,957,125

CLASS 134

22.14 4,957,566
57 R 4,957,126
117 4,957,127
118 4,957,128
151 4,957,129
158 4,957,130
167 C 4,957,123
175 4,957,131

CLASS 137

14 4,957,132
240 4,957,133
268 4,957,134
454.6 4,957,135
488 4,957,136
505.25 4,957,140
549 4,957,137
4,957,138
556 4,957,139

CLASS 138

89 4,957,141
136 B1 3,957,084

CLASS 139

88 4,957,142
190 4,957,143
434 4,957,144
4,957,145

CLASS 140

105 4,957,146

CLASS 141

83 4,957,147

CLASS 144

252 R 4,957,148

CLASS 148

12.7 N 4,957,567
13 4,957,543
254 4,957,568

CLASS 149

21 4,957,569

CLASS 152

209 R 4,957,149
454 4,957,150
4,957,151

CLASS 156

64 4,957,570
66 4,957,571
109 4,957,572
115 4,957,573
126 4,957,574
4,957,575
166 4,957,576
197 4,957,577
244.11 4,957,578
248 4,957,579
250 4,957,580
309.9 4,957,581
332 4,957,582
345 4,957,583
361 4,957,584
382 4,957,585
428 4,957,586
495 4,957,587
628 4,957,588
643 4,957,589
4,957,590
4,957,591
644 4,957,592
665 4,957,601

CLASS 160

199 4,957,600
345 4,957,152

CLASS 162

78 4,957,599
363 4,957,598

CLASS 164

7.1 4,957,153
476 4,957,154
482 4,957,155
504 4,957,156

CLASS 165

104.27 4,957,157
110 4,957,158
133 4,957,159
160 4,957,160

CLASS 166

105 4,957,161
212 4,957,162
263 4,957,164
273 4,957,163
295 4,957,165
4,957,166
319 4,957,167

CLASS 168

4 4,957,168

CLASS 169

37 4,957,169

CLASS 172

372 4,957,170

CLASS 173

104 4,957,171

CLASS 174

48 4,958,047
53 4,958,048
209 4,958,049
261 4,958,050

CLASS 175

61 4,957,172
4,957,173
72 4,957,174
94 4,957,175

CLASS 177

59 4,957,176
134 4,957,178
145 4,957,179
211 4,957,177

CLASS 178

21 Re.33,337

CLASS 180

69.1 4,957,180
79.1 4,957,181
4,957,182
234 4,957,183

CLASS 181

153 4,957,184

CLASS 182

150 4,957,185

CLASS 184

6.12 4,957,187

CLASS 186

41 4,957,188

CLASS 187

12 4,957,189
32 4,957,190
95 4,957,191

CLASS 188

71.9 4,957,192
153 R 4,957,193

CLASS 192

0.096 4,957,194
106 F 4,957,195

CLASS 194

239 4,957,196

CLASS 198

394 4,957,197
513 4,957,198
831 4,957,597
847 4,957,199

CLASS 200

80 R 4,958,051
148 R 4,958,052

CLASS 201

20 4,957,596

CLASS 202

181 4,957,200

CLASS 203

51 4,957,595

CLASS 204

27 4,957,594
106 4,957,611
129 4,957,610
157.71 4,957,608
4,957,609
157.74 4,957,607
164 4,957,606
192.12 4,957,605
192.16 4,957,604
192.27 4,957,603
192.31 4,957,602
196 4,957,612
291 4,957,593
299 R 4,957,613
411 4,957,614
415 4,957,615
435 4,957,616

CLASS 206

44.11 4,957,202
286 4,957,203
326 4,957,201
330 4,958,053
371 4,957,204
444 4,957,205

CLASS 208

113 4,957,617

CLASS 209

303 4,957,618
539 4,957,619

CLASS 210

119 4,957,625
129 4,957,624
169 4,957,623
170 4,957,622
171 4,957,621
242.3 4,957,636
248 4,957,632
264 4,957,631
358 4,957,630
443 4,957,629
519 4,957,628
635 4,957,620
679 4,957,627
695 4,957,626
705 4,957,633
711 4,957,634
767 4,957,635
782 4,957,637
4,957,638

CLASS 211

40 4,957,206

CLASS 212

192 4,957,207

CLASS 213

1.3 4,957,208

CLASS 215

1 C 4,957,209
220 4,957,210
230 4,957,211

CLASS 219

10.55 B 4,958,055
10.55 M 4,958,054
120 4,958,056
121.34 4,958,059
121.5 4,958,057
121.6 4,958,058
145.22 4,958,060
411 4,958,061
497 4,958,062
509 Re.33,343

CLASS 220

220 4,957,214
232 4,957,215
379 4,957,216
559 4,957,213

CLASS 221

210 4,957,217

CLASS 222

1 4,957,218
39 4,957,219
66 4,957,220
88 Re.33,338
129 4,957,221
148 4,957,222
340 4,957,223
465.1 4,957,224
568 4,957,225
643 4,957,226

CLASS 224

39 4,957,227
42.03 A 4,957,228
42.45 R 4,957,229
42.46 A 4,957,230
151 4,957,231
253 4,957,232

CLASS 225

26 4,957,233
65 4,957,234

CLASS 227

156 4,957,235

CLASS 228

263.21 4,957,236

CLASS 229

120 4,957,237

CLASS 235

201 FS 4,958,063
384 4,958,064
455 4,958,065
487 4,958,066

CLASS 236

49.4 4,957,238

CLASS 239

117 4,957,239
233 4,957,240
409 4,957,241
590 4,957,242

CLASS 241

34 4,957,243

CLASS 242

35.5 A 4,957,245
35.6 OR 4,957,244
55.53 4,957,246
67.1 R 4,957,247
107.7 4,957,248

CLASS 244

23 D 4,957,249
118.1 4,957,250

CLASS 248

51 Re.33,339
68.1 4,957,251
97 4,957,252
104 4,957,253
207 4,957,254
222.3 4,957,255
225.1 4,957,256
231.7 4,957,257
292.1 4,957,258
296 4,957,186
304 4,957,259
311.3 4,957,260
430 4,957,267
454 4,957,261
460 4,957,262
473 4,957,263
510 4,957,264
549 4,957,265
683 4,957,266

CLASS 249

10 4,957,268
24 4,957,269
48 4,957,270
82 4,957,271
196 4,957,272

CLASS 250

208.1 4,957,659
221 4,958,067
222.1 4,958,068
223 R 4,958,069
227.21 4,958,070
229 4,958,071
231.13 4,958,072
269 4,958,073
281 Re.33,344
309 4,958,074
343 4,958,075
4,958,076
347 4,958,077
396 R 4,958,078
397 4,958,079
483.1 4,958,080
505.1 4,958,081
548 4,958,082
572 4,958,083

CLASS 251

129.02 4,957,275
129.04 4,957,273
129.12 4,957,274

CLASS 252

8.554 4,957,639
4,957,646
8.555 4,957,640
8.6 4,957,648
32.7 E 4,957,649
34 4,957,641
42.7 4,957,642
47.5 4,957,643
4,957,645
51.5 A 4,957,650
56 R 4,957,651
62.52 4,957,644
67 4,957,652
142 4,957,653
182.25 4,957,654
186.38 4,957,647
299.01 4,957,655
311 4,957,656
373 4,957,657
400.23 4,957,658
500 4,957,660
510 4,957,661

CLASS 260

419 4,957,662

CLASS 261

34.2 4,957,664
95 4,957,665
112.100 4,957,276

CLASS 264

1.4 4,957,663
4.7 4,957,666
16 4,957,667
23 4,957,668
4,957,669
40.1 4,957,670
40.6 4,957,671
45.5 4,957,672
60 4,957,673
65 4,957,674
102 4,957,676
118 4,957,675
135 4,957,677
4,957,678
152 4,957,679
161 4,957,680
211.23 4,957,681
255 4,957,682
256 4,957,683
257 4,957,684
261 4,957,685
506 4,957,687

CLASS 267

33 4,957,277
140.5 4,957,279
166 4,957,278

CLASS 270

37 4,957,284
47 4,957,280

CLASS 271

3.1 4,957,285
90 4,957,283

CLASS 272

73 4,957,282
4,957,286
117 4,957,281

CLASS 273

1.099 4,957,287
1.5 A 4,957,289
2 4,957,288
56 4,957,290
153 R 4,957,291
159 4,957,292
162 D 4,957,293
169 4,957,294
183 B 4,957,295
201 4,957,296
213 4,957,297
240 4,957,298
409 4,957,299
428 4,957,300

CLASS 277

12 4,957,301
217 4,957,212

CLASS 280

32.6 4,957,302
250.1 4,957,303
609 4,957,304
618 4,957,305
652 4,957,306
666 4,957,307
4,957,308
707 4,957,309

CLASS 283

34 4,957,310
56 4,957,311
89 4,957,312

CLASS 285

144 4,957,313
355 4,957,314

CLASS 292

251.5 4,957,316
256.67 4,957,317
337 4,957,315

CLASS 294

19.2 4,957,319
64.1 4,957,318
106 4,957,320

CLASS 296

65.1 4,957,321
180.2 4,957,322
4,957,325
181 4,957,323
190 4,957,324
210 4,957,326

CLASS 299

11 4,957,327

CLASS 301

105 R 4,957,328

CLASS 303

97 4,957,329
115 4,957,330
4,957,331

CLASS 305

39 4,957,332

CLASS 307

10.2 4,958,084
262 4,958,085
296.8 4,958,086
425 4,958,087
443 4,958,088
448 4,958,089
451 4,958,091
456 4,958,090
480 4,958,092
540 4,958,093
570 4,958,094

CLASS 310

59 4,958,095
68 E 4,958,096
83 4,958,097
156 4,958,098
254 4,958,099
328 4,958,100
4,958,101

CLASS 312

108 4,957,333
221 4,957,334

CLASS 313

1 4,958,102
25 4,958,103
495 4,958,104

CLASS 315

169.3 4,958,105
208 4,958,106
289 4,958,107
307 4,958,108
4,958,109
408 4,958,110

CLASS 318

6 4,958,111
280 4,958,112
568.18 4,958,113
616 4,958,114
662 4,958,115
727 4,958,118
800 4,958,116
805 4,958,117

CLASS 322

91 4,958,119

CLASS 323

224 4,958,121
315 4,958,122
316 4,958,123

CLASS 324

96 4,958,124
162 4,958,125
318 4,958,126
426 4,958,127
559 4,958,128
661 4,958,129
700 4,958,130
708 4,958,131

CLASS 328

155 4,958,120

CLASS 330

110 4,958,132
253 4,958,133

CLASS 333

12 4,958,134

CLASS 335

8 4,958,135
42 4,958,136
128 4,958,137

CLASS 336

180 Re.33,345

CLASS 338

114 4,958,138

CLASS 340

122 4,958,139
146.2 4,958,140
4,958,141
426 4,958,142
479 4,958,143
606 4,958,144
689 4,958,145
703 4,958,146
706 4,958,147
712 4,958,148
715 4,958,149
783 4,958,150
784 4,958,151
4,958,152
825.5 4,958,153
825.690 4,958,154

CLASS 341

120 4,958,155
123 4,958,156
133 4,958,157
143 4,958,158
144 4,958,159

CLASS 342

122 4,958,161

CLASS 343

700 MS 4,958,162
745 4,958,163
749 4,958,164
770 4,958,165
771 4,958,166
853 4,958,167

CLASS 346

75 4,958,168
108 4,958,169
136 4,958,170
153.1 4,958,171
159 4,958,172
160.1 4,958,173

CLASS 350

3.71 4,957,336
96.13 4,957,337
96.15 4,957,338
4,957,339
96.16 4,957,340
96.18 4,957,342
96.21 4,957,343
96.23 4,957,344
4,957,345
96.26 4,957,346
96.32 4,957,347
105 4,957,335
254 4,957,341
321 4,957,348
333 4,957,349
334 B1 Re.32,521
336 4,957,350
337 B1 4,540,243
348 4,957,351
353 4,957,352
431 4,957,354
432 4,957,355
574 4,957,356
576 4,957,357
588 4,957,358
637 4,957,359

CLASS 351

221 4,957,360

CLASS 352

59 4,957,361

CLASS 354

106 4,958,174
152 4,958,175
173.11 4,958,176
195.1 4,958,177
195.12 4,958,178
4,958,179
403 4,958,180
412 4,958,181
4,958,182
4,958,183
474 4,958,184
478 4,958,185

CLASS 355

41 4,958,186
53 4,958,160
202 4,958,187
206 4,958,188
208 4,958,189
228 4,958,190
245 4,958,191
4,958,192
259 4,958,193
277 4,958,194
290 4,958,195
298 4,958,196
299 4,958,197
309 4,958,198
317 4,958,199

CLASS 356

5 4,957,362
73 4,957,363
73.1 4,957,364
4,957,365
318 4,957,366
359 4,957,367
369 4,957,368
376 4,957,369
381 4,957,370
419 4,957,371

CLASS 357

5 4,958,200
16 4,958,201
17 4,958,202
22 4,958,203
4,958,204
23.6 4,958,206
23.7 4,958,205
24 4,958,207
34 4,958,208
4,958,209
4,958,210
38 4,958,211
54 4,958,212
59 4,958,213
73 4,958,216
74 4,958,214
79 4,958,215
84 4,958,222

CLASS 358

75 4,958,217
4,958,218
4,958,219
76 4,958,220
80 4,958,221
106 4,958,223
126 4,958,224
133 4,957,688
4,958,225
136 4,958,226
148 4,958,227
158 4,958,228
180 4,958,229
186 4,958,230

211 4,958,231
296 4,957,689
300 4,958,232
302 4,958,233
327 4,958,234
402 4,958,235
445 4,958,236
451 4,958,237
456 4,958,238
457 4,958,239
475 4,958,240
487 4,958,241

CLASS 360

27 4,958,242
51 4,958,243
72.1 4,958,244
77.03 4,958,245
77.15 4,958,246
90 4,958,247
107 4,958,248
133 4,958,249

CLASS 361

40 4,958,250
84 4,958,251
93 4,958,252
119 4,958,253
4,958,254
212 4,958,255
331 4,958,256
385 4,958,257
386 4,958,258
394 4,958,259
398 4,958,260
417 4,958,261
426 4,958,262

CLASS 362

32 4,958,263
106 4,958,264
293 4,958,265
310 4,958,266
399 4,958,267

CLASS 363

16 4,958,268

CLASS 364

153 4,958,269
187 4,958,270
200 4,958,271
4,958,273
4,958,274
4,958,275
4,958,276
4,958,277
4,958,278
403 4,958,280
413.01 4,958,281
413.13 4,958,282
4,958,283
419 4,958,284
4,958,285
422 4,958,286
424.1 4,958,287
426.04 4,958,288
431.01 4,958,289
463 4,958,290
464.02 4,958,291
468 4,958,292
474.03 4,958,293
483 4,958,294
497 4,958,295
509 4,958,296
518 4,958,272
4,958,297
519 4,958,298
520 4,958,299
521 4,958,300
4,958,301
4,958,302
4,958,303
4,958,304
522 4,958,305
550 4,958,306
551.01 4,958,307
574 4,958,308
580 4,958,309
718 4,958,310
724.01 4,958,311
754 4,958,312
757 4,958,313
900 4,958,314
4,958,315

CLASS 365

63 4,958,316
104 4,958,317
149 4,958,318
154 4,958,319
174 4,958,320
185 4,958,321
189.01 4,958,322
4,958,323
201 4,958,324
206 4,958,325
218 4,958,326

CLASS 366

76 4,957,372
197 4,957,373

CLASS 367

7 4,958,327
15 4,958,328
20 4,958,329
88 4,958,330
130 4,958,331
140 4,958,332
154 4,958,333

CLASS 368

282 4,958,279
4,958,334

CLASS 369

44.14 4,958,335
44.21 4,958,336
58 4,958,337
59 4,958,338
98 4,958,339

CLASS 370

60.1 4,958,341
79 4,958,342
85.1 4,958,343
112 4,958,344

CLASS 371

21.3 4,958,345
4,958,346
29.5 4,958,347
37.1 4,958,348
4,958,349
37.4 4,958,350
40.1 4,958,351
4,958,352
49.4 4,958,353

CLASS 372

29 4,958,354
45 4,958,355
59 4,958,356
96 4,958,357

CLASS 373

72 4,958,358

CLASS 374

142 4,957,374

CLASS 375

1 4,958,359
97 4,958,360
102 4,958,361

CLASS 376

216 4,957,690
245 4,957,691
260 4,957,692
298 4,957,693
310 4,957,694
364 4,957,695
419 4,957,696
442 4,957,697
444 4,957,698

CLASS 377

20 4,958,362

CLASS 378

85 4,958,363
122 4,958,365
144 4,958,364

CLASS 379

74 4,958,366
84 4,958,367
91 4,958,368
156 4,958,369
157 4,958,370
377 4,958,371

CLASS 381

72 4,958,372

CLASS 382

8 4,958,373
4,958,374
14 4,958,375
31 4,958,376
34 4,958,377
4,958,378
59 4,958,379

CLASS 384

43 4,957,376
247 4,957,375

CLASS 388

806 4,958,380

CLASS 400

50 4,957,377
120 4,957,378
4,957,379
196.1 Re.33,340
279 4,957,380
621 4,957,381
856 4,957,382

CLASS 401

55 4,957,383
65 4,957,384
132 4,957,385

CLASS 403

231 4,957,386
322 4,957,387
344 4,957,388

CLASS 404

70 4,957,390
72 4,957,389
94 4,957,391

CLASS 405

73 4,957,392
128 4,957,393
4,957,394
287 4,957,395

CLASS 407

114 4,957,396

CLASS 408

224 4,957,397

CLASS 409

136 4,957,398

CLASS 410

87 4,957,399
110 4,957,400

CLASS 411

5 4,957,401
84 4,957,402
368 4,957,403

CLASS 413

8 4,956,906

CLASS 414

324 4,957,404
339 4,957,405
404 Re.33,341
416 4,957,406
498 4,957,407
635 4,957,408
788.4 4,957,409

CLASS 415

169.1 4,957,410
173.4 4,957,411
189 4,957,412

CLASS 416

115 4,957,413
229 R 4,957,414
245 R 4,957,415

CLASS 417

273 4,957,416
4,957,419
423.13 4,957,417
494 4,957,418

CLASS 418

255 4,957,420

CLASS 419

8 4,957,421

CLASS 420

41 4,957,699
59 4,957,700
69 4,957,701
104 4,957,702
448 4,957,703

CLASS 422

14 4,957,704
94 4,957,705
100 4,957,706
102 4,957,707
106 4,957,708
134 4,957,709
171 4,957,710
245 4,957,711
249 4,957,712
4,957,713

CLASS 423

24 4,957,714
228 4,957,715
235 4,957,716
240 4,957,717
244 4,957,718
328 4,957,719
392 4,957,720
449 4,957,723
461 4,957,721
496 4,957,722
574 R 4,957,724
592 4,957,725
644 4,957,726
647 4,957,727

CLASS 424

1.1 4,957,728
5 4,957,729
50 4,957,686
61 4,957,730
62 4,957,731
73 4,957,732
85.4 4,957,733
85.7 4,957,734
85.8 4,957,735
88 4,957,736
4,957,737
4,957,738
92 4,957,739
94.4 4,957,740
195.1 4,957,743
401 4,957,744
461 4,957,745
490 4,957,746
532 4,957,742
551 4,957,741
691 4,957,747

CLASS 425

114 4,957,422
115 4,957,423
145 4,957,424
362 4,957,425
367 4,957,426

CLASS 426

2 4,957,748
10 4,957,749
19 4,957,750
36 4,957,751
43 4,957,752
74 4,957,769
111 4,957,753
138 4,957,754
242 4,957,755
243 4,957,756
281 4,957,757
330.6 4,957,758
399 4,957,759
4,957,760
410 4,957,761
457 4,957,762
548 4,957,763
573 4,957,764
586 4,957,765
590 4,957,767
592 4,957,766
604 4,957,768

CLASS 427

9 4,957,770
38 4,957,771
39 4,957,772
4,957,773
45.1 4,957,774
53.1 4,957,775
54.1 4,957,776
55 4,957,777
152 4,957,778
193 4,957,779
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06 : 7,329
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53 : 7,328

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